FACT SHEET FOR FRESH FRUIT PACKING GENERAL PERMIT

ISSUED: JUNE 15, 2004
EFFECTIVE: JULY 2, 2004 EXPIRATION: JULY 1, 2009

SUMMARY

The Washington State Department of Ecology (Department) has tentatively determined to reissue a general permit to the fresh fruit packing industry operating in the State of Washington (State) outlining those discharges which will be subject to certain treatment/disposal methods (TDMs) and effluent limitations. Permittees have a duty to comply with all of the limitations and TDMs. This may require the installation of industrial pretreatment facilities, best management practices (BMPs), or other conditions deemed necessary by the Department to carry out the provisions of State and Federal law. The proposed terms, limitations and conditions contained herein are tentative and may be subject to change, subsequent to public hearings. Facilities covered under the general permit will not be relieved of any responsibility or liability at any time during the life of the permit for: (1) violating or exceeding State water quality standards; or (2) violating any other local, State, or Federal regulation or standard as may pertain to the individual facility. Facilities not accepted under the general permit will be required to apply for an individual permit. Any fresh fruit packing facility not covered under either the general permit or an individual permit will be considered to be operating without a discharge permit and subject to potential enforcement action.

PUBLIC COMMENT AND INFORMATION

A Public Notice of Draft (PNOD) was published in the State Register and 2 newspapers (the Yakima Herald-Republic and Wenatchee World) on April 7, 2004. Two (2) public hearings on the draft Fresh Fruit Packing General Permit were held at least thirty (30) days after the date of the public notice. The first hearing was held in the City of Yakima at the Department of Ecology Central Regional Office at 15 West Yakima Avenue, Suite 200 on Monday, May 10, 2004 at 3:00 p.m. The second hearing was held in the City of Wenatchee at the Washington Apple Commission Building on Tuesday, May 11, 2004 at 3:00 p.m. A one hour workshop to explain proposed changes and answer questions was held immediately preceding both hearings.

Interested persons were invited to submit comments regarding the proposed reissuance of the Fresh Fruit Packing General Permit. Comments on the general permit may have been given at the public hearings as either written or oral testimony. Written comments may also have been submitted to the Ecology Central Regional Office at the address below:

Washington State Department of Ecology
Central Regional Office
Attention: General Permits Manager
15 West Yakima Avenue, Suite 200
Yakima, Washington 98902

All comments must have been submitted by 5:00 p.m. on May 12, 2004 (within 35 days of the date of publication of the PNOD) to be considered in the final permit determination. A responsiveness summary was prepared and available for public review. It also was sent to all parties who submitted comments by the May 12, 2004 deadline.

The final determination on the general permit remained substantially unchanged from that published in the public notice. A Public Notice of Issuance (PNOI) was published on June 2, 2004 and was also sent to all permittees, interested parties, and persons who submitted written comment or gave public testimony regarding the permit. Since the final determination was substantially unchanged, a second PNOD was not needed.

The permit was issued on June 15, 2004 and will become effective on July 2, 2004.

The proposed and final general permit, fact sheet, application form, and other related documents are on file and may be inspected and copied between the hours of 8:00 a.m. and 4:30 p.m., weekdays at the following Department locations:

Washington State Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902
(509) 454-7298
TDD (509) 454-7673
FAX (509) 575-2809
Contact: Steven Huber

Washington State Department of Ecology
Eastern Regional Office
North 4601 Monroe
Spokane, WA 99205
(509) 456-2874
TDD (509) 458-2055
FAX (509) 456-6175
Contact: Mike Huffman

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INTRODUCTION

This fact sheet is a companion document designed to provide the basis for reissuance of the Fresh Fruit Packing General National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge (SWD) Permit. This general permit was originally issued on February 10, 1994 and reissued on June 15, 1999. The Department of Ecology (the Department) is proposing to reissue this permit, which will allow discharge of wastewater from the fresh fruit packing industry to waters of the State of Washington, pursuant to the provisions of chapters 90.48, 90.52, and 90.54 Revised Code of Washington (RCW) and the Federal Water Pollution Control Act (FWPCA) as amended. This fact sheet explains the nature of the proposed discharges, the Department's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for these decisions.

The Federal Clean Water Act (FCWA, 1972, and later modifications (1977, 1981, and 1987), established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The establishment of a general permit for the fruit packing industry is logical due to: (1) the similar wastewater characteristics among facilities, (2) the uniform discharge conditions to which all facilities would be subject, and (3) the significant reduction of resources necessary for permit issuance and management. However, individual permits will still be applied in those instances where a facility requires more detailed guidance, or when an individual packer so desires and the Department approves.

The regulations adopted by the State include procedures for issuing general permits (Chapter 173-226 WAC), water quality criteria for surface and ground waters (Chapters 173-201A, 40 CFR 131.36, and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-226-110) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the draft permit, public hearings, comment periods, and public notice of issuance are all required before the general permit is issued (WAC 173-226-130). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by representatives of the industry. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. Factual information in the fact sheet will not be revised after the public notice is published. Comments and the resultant changes to the permit will be summarized in Appendix B--Response to Comments.

BACKGROUND INFORMATION

WATER QUALITY PROTECTION REQUIREMENTS

Sections 301, 302, 306, and 307 of the FWPCA established discharge standards, prohibitions, and limits based on pollution control technologies. These technology-based limits are "best practical control technology" (BPT), "best available technology economically achievable" (BAT), and "best conventional pollutant control technology economically achievable" (BCT). Compliance with BPT/BAT/BCT may be established using a "best professional judgment" (BPJ) determination.

The State has similar technology-based limits which are described as: "all known, available and reasonable methods of prevention, control and treatment" (AKART). AKART is referred to in State law under RCW 90.48.010, RCW 90.48.520, 90.52.040 and RCW 90.54.020. The Federal technology-based limits and AKART are similar but not equivalent. AKART: (1) may be established for an industrial category or on a case-by-case basis; (2) may be more stringent than Federal regulations; and (3) includes not only treatment, but also BMPs such as prevention and control methods (i.e. waste minimization, waste/source reduction, or reduction in total contaminant releases to the environment). The Department and the Federal Environmental Protection Agency (EPA) concur that, historically, most discharge permits have determined AKART as equivalent to BPJ determinations. The proposed BMPs, limitations and prohibitions, obtained by BPJ determinations, for this Fresh Fruit Packing General Permit are substantially similar to those established by the State of Michigan to regulate its fresh fruit packing industry.

RCW 90.48.035 authorizes establishment of water quality standards for waters of the State. The State has implemented ground water quality standards in chapter 173-200 State of Washington Administrative Code (WAC). The State has also implemented surface water quality standards in chapter 173-201A WAC. All waste discharge permits, whether issued pursuant to NPDES or SWD regulations: (1) are anticipated to prevent damage to waters of the State, and (2) are conditioned in such a manner that all authorized discharges shall meet State water quality standards. All those standards include an "antidegradation" policy which stipulates that existing quality and beneficial uses shall be protected. Implementation of the surface water antidegradation policy is discussed in more detail starting on page 63 (“Surface Water” section of this fact sheet).

Discharges from the fresh fruit packing industry may contain pollutants which, in excessive amounts, have a reasonable potential to cause, or contribute to, violations of State water quality due to the presence of total dissolved solids, chlorine, turbidity, oxygen demand, high temperature, high or low pH, or toxic materials. The Department has tentatively determined that, when properly treated and disposed of in accordance with the terms and conditions of the general permit, fresh fruit packing discharges: (1) are anticipated to not allow permit backsliding; (2) are anticipated to comply with State water quality standards; (3) are anticipated to protect POTW facilities and by-products; (4) are anticipated to maintain and protect the existing characteristic beneficial uses of the waters of the State; and (5) are anticipated to protect human health. New information collected during the term of this permit that indicates violation of the water quality standards may cause reopening of the general permit.

RECEIVING WATER IDENTIFICATION

The activities of the Fresh Fruit Packing General Permit applicants may potentially affect both surface and ground waters of the State. These waters are protected by chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington, 40 CFR 131.36, The National Toxics Rule, and chapter 173-200 WAC, Water Quality Standards for Ground Waters of the State of Washington. The purpose of these standards is to establish the highest quality of State waters, through the reduction or elimination of contaminant discharges to the waters of the State, consistent with: public health; public enjoyment; the propagation and protection of fish, shellfish, and wildlife; and existing and future beneficial uses. This purpose is reached, in part, by the fresh fruit packing industry compliance with the limitations, terms and conditions of the Fresh Fruit Packing General Permit.

The small percentage of fresh fruit packing facilities which discharge, directly or indirectly, to surface waters shall be required to meet, at a minimum, all the State water quality standards for Class A surface waters as given in chapter 173-201A WAC. Surface waters which may receive discharges from the fresh fruit packing industry include both Class AA and Class A waters. One example of Class AA waters which may be affected includes that section of the Wenatchee River from the Wenatchee National Forest boundary (river mile 27.1) to the headwaters. Examples of Class A waters which may be affected include, but are not limited to, major sections of the Columbia, Naches, Okanogan, Wenatchee, and Yakima Rivers. In addition, all surface waters not specifically categorized in chapter 173-201A WAC will be automatically judged to be Class A, unless they are tributary to Class AA surface waters. These Class AA tributary surface waters shall be considered Class AA themselves. The characteristic beneficial uses of Class AA and A surface waters include, but are not limited to, the following: domestic, industrial and agricultural water supply; stock watering; the spawning, rearing, migration and harvesting of fish; the spawning, rearing and harvesting of shellfish; wildlife habitat; recreation (primary contact, sport fishing, boating, aesthetic enjoyment of nature); commerce and navigation.

The larger percentage of fresh fruit packing facilities which discharge, directly or indirectly, to ground waters shall be required to meet, at a minimum, all the State water quality standards as given in chapter 173-200 WAC. Ground waters which may receive discharges from the fresh fruit packing industry generally are high quality and no significant or substantial degradation is allowed.

For discharges which contain complex synthetic chemicals, the ground water standards mean that no significant change is allowed above background water quality. A significant change occurs when a contaminant level increases above background water quality levels when using the lowest quantifiable analytical method. For discharges which contain other chemicals, the ground water standards mean that no substantial change of background water quality, or exceedance of any listed chemical criterion, is allowed. A substantial change occurs when a chemical contaminant level increases above background water quality by at least 50%.

WATER SOURCES

The fresh water utilized by the fresh fruit packing industry is obtained from municipal purveyors, reservoirs, surface water (such as the Columbia River), or ground water (wells). The amount of water consumed during packing operations varies depending upon the following: facility size, operating policies, type of the cooling water system, water cost and availability, and even the condition of the

harvested fruit. However, those fresh fruit packers utilizing a presize scheme typically use larger amounts of fresh water than those not using a presize scheme. This increase in water use is due primarily to the flumes, as well as some duplication of process units (washes and rinses).

DESCRIPTION OF THE FRUIT PACKING INDUSTRY

Types Of Facilities Or Dischargers Covered

Every new or existing fresh fruit packing facility which receives, packs, stores, and/or ships either hard or soft fruit, and discharges wastewater (with the exception of discharges of only domestic wastewater or discharges only to a delegated pretreatment POTW) , shall be required to apply for and obtain coverage under either this general permit or an individual NPDES/State Waste Discharge Permit.

Any facility, as described above, which is located on the Colville Reservation may apply for coverage of only non-surface water discharges under this general permit. Only those sections of this general permit which deal with non-surface water discharges will apply to those facilities located on the Colville Reservation. Discharges to surface water on the Colville Reservation remain under the jurisdiction of the USEPA.

Geographical Area Of Coverage

For the purposes of the general permit, the State's fresh fruit packing industry shall be defined as those commercial facilities which receive, pack, store, and/or ship either hard or soft fruit. Although, the industry is primarily located in the State's centralized fruit growing region along the Columbia, Yakima, Wenatchee, and Okanogan Rivers, the geographical area for which the general permit is valid includes the entire State. This fact sheet will primarily discuss apple and pear packers; however, some information may also relate and apply to the packing of other fruit, especially stone fruit, since they are typically packed at the same facilities. Any differences, relative to varying fruit types, in packing operations and methods will be noted where appropriate.

History

The State is a nationally recognized leader in fruit production which accounted for 53% of apples, 46% of sweet cherries, and 44% of pears grown in the U.S. in 2001. The State's 2001 overall fruit crop returned $1.33 billion in revenue. The fruit packing industry is responsible for preparing, storing, and packing any fruit production which is not immediately processed. The State's primary fruit products are apples and pears, both hard fruits, with their respective 2001 productions being 2,550,000 and 447,000 tons. Soft fruit 2001 production tonnages include: grapes (283,000), cherries (106,000), peaches (27,500), prunes (5600), and apricots (5200). Berries and plums are also minor soft fruit productions. (2002 Washington Agricultural Statistics, compiled by Washington Agricultural Statistics Service, pp. 6-8)

Improvements in post-harvest packing and shipping methods are helping to increase world demand, which has allowed the industry to develop trading relationships with numerous international markets including New Zealand, Chile, Mexico, Canada, Saudia Arabia, Brazil and several Pacific Rim countries such as Japan, Taiwan, Thailand, and Indonesia. Globalization has also led to increased competition in the market. This increased competition combined with other factors resulted in some

consolidation within the industry. The number of permittees has declined from approximately 285 in 1996, to 233 in 1999 when the permit was reissued, to a current level in 2003 of approximately 182. This decrease also reflects the transfer of 10 permits to the City of Yakima due to pretreatment delegation.

Prior to the issuance of this general permit, fresh fruit packers typically concentrated mainly on the disposal of wastewater to sites such as drainfields, dry wells, ditches, bin storage lots, unlined ponds/lagoons, land application sites, both private (on-site) and municipal domestic sewage treatment facilities, and surface waters. Those industrial disposal practices posed potential contamination problems to the State's ground and surface water supplies, and in some cases caused substantial upsets at publicly owned treatment plants (POTW's). An important goal of the general permit was to introduce the concept of wastewater treatment, in conjunction with disposal. A significant reduction in the discharge of fresh fruit packing pollutants to waters of the State can be achieved by using proper best management practices (BMPs), which include alternative process wastewater Treatment / Disposal Methods (TDMs). While many fresh fruit packers were already using proper TDMs (i.e. lined evaporative lagoons, land application) and/or alternative in-house process technologies (i.e. ozonation), some of the industry's disposal practices prior to issuance of the general permit were not adequate to meet the terms and conditions of the general permit, which had been developed to protect the quality of State waters. The general permit was used to identify the acceptable BMPs and alternative TDMs for the fresh fruit packing industry's wastewater discharges and to set a compliance deadline of July 31, 1996 to implement these BMPs and TDMs.

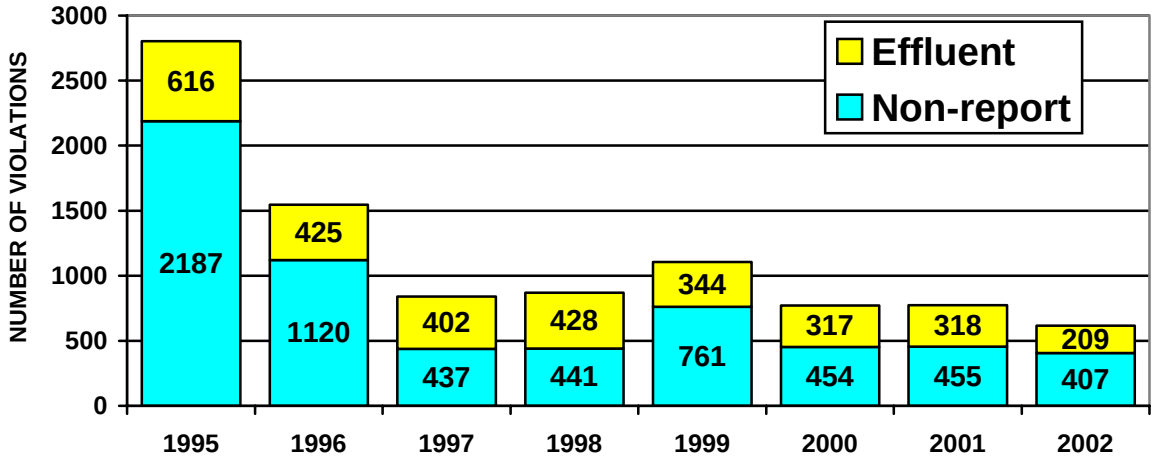
Compliance With Previous Permit

Permit compliance consists of 2 parts: 1) submittal compliance, which is submitting reports on time and 2) monitoring compliance, which is testing the wastewater to verify compliance with the permit effluent limits. Overall there was some improvement in submittal compliance during this permit cycle. On average almost 75 % of the Yearly Facility Reports (YFRs) were submitted on time and almost 90% were within one week of the deadline. This compares to 65 % on time and 85 % within one week in the previous cycle. All YFRs were eventually submitted. The submittal of monthly Discharge Monitoring Reports for surface water discharges also showed improvement.

Monitoring compliance includes both non-reporting violations, which is failure to complete a required test, and effluent violations, which is an actual exceedance of the permit effluent limit. Chart 1 below summarizes monitoring violations since the permit was issued.

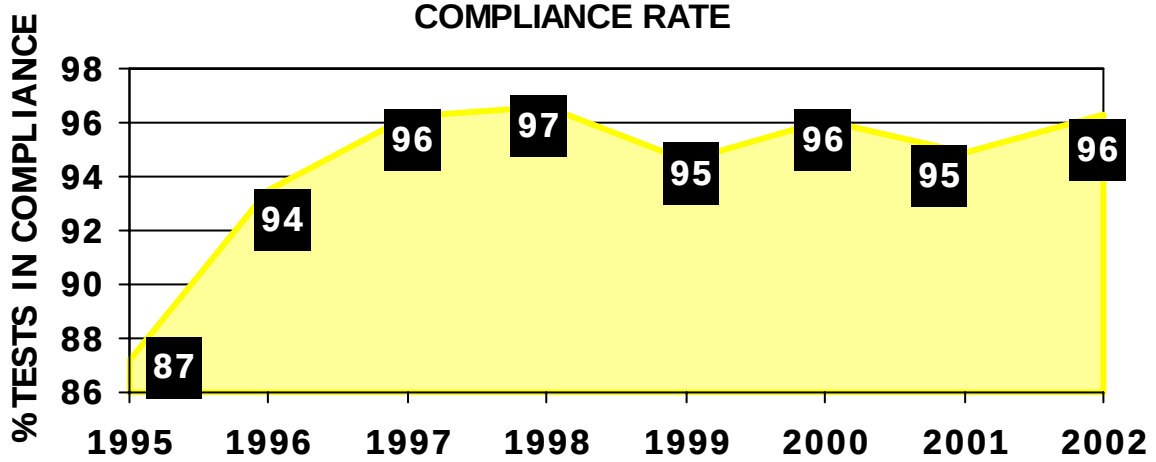
Permit reissued June 1999

CHART 1
MONITORING VIOLATIONS 1995 - 2002



The total number of violations has remained relatively steady for the last three years. The compliance rate (percentage of test results in compliance) has been 95% to 97% for the last 6 years (see Chart 2).

CHART 2
COMPLIANCE RATE



Wastewater Characterization

A postharvest chemical use survey was conducted by the USDA in 2002, referencing the 2001 crop year for apples and pears stored. Table 1 below summarizes the major chemical use data for Washington State from that survey. Values are based upon 5,810.7 million pounds of apples stored and 1,070.6 million pounds of pears stored. (Agricultural Chemical Usage – Postharvest Applications – Apples and Pears, March 2003, USDA, National Agricultural Statistics Service, Ag Ch1 (03).).

Table 1. Postharvest Chemical Usage

APPLES		
Chemical [1]	% of Crop Treated	Total Applied (1,000 Lbs)
Diphenylamine (DPA)	30.1	89.8
Thiabendazole	42.5	44.8
Sodium hypochlorite	15.2	16.7
Citric acid	6.6	15.1
Phosphoric acid	17.6	13.9
Hydrogen chloride	9.9	6.0
Calcium chloride	0.5	5.6
Chlorine	22.3	1.4
Chlorine dioxide	15.3	1.3
Dodecylbenenesulfonic acid	5.0	0.9
Dodecylbenzine sodium sulfonate	2.6	0.2
Silicon emulsion	17.7	0.1
PEARS		
Chemical [2]	% of Crop Treated	Total Applied (1,000 Lbs)
Sodium silicate	8.4	64.2
Calcium lignosulfonate	16.3	20.9
Sodium o-phenylphenate (SOPP)	28.9	19.4
Sodium sulfate anhydrous	10.1	7.9
Thiabendazole	37.2	2.5
Chlorine	33.6	1.5
Ethoxyquin	25.5	0.6

1 Insufficient or limited reports to publish usage data for acidic cleaner, alkaline cleaner, Candida oeophila isolate, captan, fruit wax, organic cleaner, Pseudomonas syringae ESC-10, Pseudomonas syringae ESC-11, sodium chlorite, and sodium o-phenylphenate (SOPP).

2 Insufficient or limited reports to publish usage data for acidic cleaner, alkaline cleaner, Candida oeophila isolate, captan, chlorine dioxide, citric acid, dodecylbenzene sodium sulfonate, fruit wax, hydrogen chloride, petroleum distillate, phosphoric acid, organic cleaner, Pseudomonas syringae ESC-10, Pseudomonas syringae ESC-11, silicone emulsion, and sodium hypochlorite.

An EPA study on wastewater contamination by pre-harvest chemical carry-over found no detectable trace of fifty (50) different pre-harvest pesticides and herbicides in float solution effluent of fruit taken from controlled atmosphere (CA) storage (Esvelt and Hart, "The Health Effect Potential of Reusing Fruit Processing Wastewater", EPA HERL, Cincinnati, May 1984). Chemical usage is process specific, and therefore, an analysis of individual processes can be used to determine the appropriate BMPs for wastewater treatment/disposal.

PERMIT STATUS

This general permit was originally issued on February 10, 1994. It established six (6) Treatment / Disposal Methods (TDMs) along with allowed discharges, effluent limits, and best management practices specific to each TDM. Those TDMs are: 1) lined evaporative lagoons, 2) dust abatement, 3) POTW, 4) land application, 5) percolation systems, and 6) surface waters. The permit was reissued on

June 15, 1999. Application forms for renewal of coverage under the general permit were mailed to all Permittees on July 9, 2003. Completed forms were required to be submitted to the department by January 2, 2004, which is 180 days prior to expiration of the current permit.

INDUSTRIAL PROCESSES

General operations

Industrial fresh fruit packing operations vary with the individual packer, customer preference, and the type/variety of fruit being processed; although, the characteristics of discharged wastewater are quite similar. Fruit packing was historically seasonal, coinciding with the fruit harvest season which generally begins in June (cherries) and ends in November (apples). However, with the advent of controlled atmosphere (CA) storage, the packing of apples has become a nearly year long activity.

Specifically, apples when freshly picked are first collected in wooden or plastic bins each containing approximately 25 boxes. These bins are subsequently stacked and trucked to warehouse facilities for final preparation, packing, and storage. Upon arrival at the packing warehouses, the apples will be handled in one of three ways: (1) immediately processed, (2) put into regular cold rooms (refrigeration only) for short-term storage, or (3) placed in controlled atmosphere (CA) rooms for intermediate or long-term storage after first being treated with antioxidants/fungicides. The stored apples are removed, as needed, from storage and washed, waxed, packaged and shipped to market.

In the process of CA storage, the apples are placed in a sealed warehouse, wherein the internal temperature is rapidly reduced to near 32 degrees. Simultaneously, the atmospheric oxygen content is reduced to as low as practical (generally less than 3%) by replacement with nitrogen gas. Recently, it also has been discovered that a high humidity (90-95%) is advantageous during storage for maintaining quality. This type of storage has enabled the industry to maintain a high-quality marketable product throughout the entire year. This is in significant contrast to those apples held in regular cold storage which are marketable only for a few months following harvest, usually until January or February. The predominant industrial fresh fruit packing chemical products used include: antioxidants, disinfectants, biocides, fungicides, waxes, and cleaners.

The process of storing fruit, in either CA or regular cold storage, requires substantial cooling capabilities. There are various cooling systems possible (i.e. Freon, ammonia phase change) with most using at least some water for defrosting purposes. The fresh fruit packing industry has trended toward evaporative cooling systems in which water is recirculated through tall towers where captured heat energy is released through evaporation. Although these systems effectively reduce overall water consumption, recirculation of water can lead to "fouling" of the towers. Fouling is characterized by two principal occurrences: (1) chemical scale (calcium and magnesium salts) formation and (2) physical blockages (suspended solids, corrosion products, and microbial growth). These principal fouling problems are typically controlled by regular treatments with chemical products, some of which display toxic properties.

The utilization of both CA storage and evaporative cooling tower methods has significantly increased the marketability of fruit throughout the entire year. These same methods, however, involve the use of chemical additives, some of which have a significant potential to be discharged as waste into the environment and may result in the degradation of surface and ground water quality. Compliance with

the Fresh Fruit Packing General Permit has been demonstrated to contribute to protection of the waters of the State.

The fresh fruit packing industry's wastewater typically originates from seven different process areas: drencher, float tank, flumes (presize schemes only), packing lines (wash/rinse/wax) and cleanup, non-contact cooling water, sanitary sewage, and stormwater. These wastewaters are characterized below:

Post-Harvest / Pre-Packing Processes - Drenchers

Fresh fruit picked in the orchards must be either immediately processed or go into storage (either CA or regular cold storage) for later shipment to market. During storage, fruit are susceptible to several post-harvest diseases and disorders. The most common ***diseases*** are: (1) Gray Mold, *Botrytis*, which enters through the calyx and wounds in the skin at the field site; (2) Blue Mold, *Penicillium*, which enters through wounds or bruises during storage; (3) Bull's Eye Rot, which is a rot established on the fruit in the orchard; and (4) Mucor Rot, which is a soil-borne fungus that grows well at cold storage temperatures. The most common ***disorders*** are: (1) Scald, which is a brown discoloration of the skin caused by oxidation; and (2) Bitter Pit, another degradation of the fruit flesh. A more detailed description of common postharvest diseases and disorders can be found “Market Diseases of Apples, Pears, and Quinces, Agricultural Handbook No. 376, ARS-USDA.

In order to reduce the transmission of such diseases and the occurrence of disorders, the fresh fruit packing industry relies on various chemical treatments. Typically, the first application of a post-harvest chemical is accomplished at the "drencher", immediately prior to the fruit being placed in CA storage. Upon leaving CA storage, the fruit are subjected to another chemical treatment in the "float" tank where they are floated out of their storage containers. Finally, they are washed, rinsed, waxed, dried, packaged, and held in regular cold storage for ultimate shipment to market.

Certain varieties of apples are drenched with a solution containing the antioxidant diphenylamine (DPA) combined with a fungicidal chemical such as thiobendazole (TBZ), prior to CA storage. DPA is used to combat the most important post-harvest apple disorder, scald, while TBZ is used to reduce postharvest decay. In addition, calcium chloride is sometimes used as a post harvest drench to prevent disorders, such as bitter pit in Granny Smith, Golden Delicious, Braeburn, and other varieties of apples which are susceptible to these disorders. Calcium chloride is used alone or in conjunction with DPA and TBZ. Pears, another hard fruit, may be drenched with an Ethoxyquin® solution. Soft fruits such as peaches, apricots, nectarines and plums (stone fruit) are not typically drenched before storage. Other soft fruit, such as prunes and berries, never use any drench solution and are packed "dry". Still others, such as cherries and some varieties of pears, are not truly "drenched" but are rather "hydrocooled" which usually involves drenching in cold water containing chorine or some other fungicide.

Drencher wastewater normally contains high concentrations of the antioxidants DPA (for apples) and Ethoxyquin® (for pears), and the fungicide TBZ (for apples and pears). Miscellaneous solid orchard waste residuals such as soil, leaves and twigs are usually present in the drencher wastewater. Since the fungicides adhere strongly to soil particles, they may potentially accumulate in any resultant sludge. However, sludge analysis data, provided to the Department's Solid and Dangerous Waste Section, indicated that drencher sludge did not designate as dangerous waste. The Department's booklet entitled A Guide for Fruit Packing Warehouses: How to Properly Manage and Reduce Your Pesticide

Hazardous Wastes may be used to easily classify any fresh fruit packing wastestream as to whether it qualifies as a dangerous waste.

Calcium chloride is used at concentrations which pose a potential for salt build-up in the soil and eventual leaching to groundwater. This permit will specify application rates which should be protective of groundwater quality. Another possible optional drencher additive is a food grade silicone defoaming agent, which is not considered environmentally detrimental at the concentrations typically used by the fresh fruit packing industry.

Drenching may be accomplished by either of two methods: truck-drenching or bin-drenching. In **truck-drenching,** typical for processing more than 50,000 bins per year, the drench solution is applied to the fruit while still in bins on the truck. A typical truck-drencher has one 1,500 to 3,000 gallon storage tank with side and overhead coarse-spray nozzles. Drenchers, typically used only during harvest, must be drained periodically to remove dirt, sticks, leaves, and organic wastes, and to recharge the chemical agents. The predominant method for determining when to drain is dependant upon the number of bins processed and label instructions, which specifies the number of bins that can be drenched per gallon of drencher solution. However, drenching solutions have also been drained when the DPA (or other chemical) concentration has tested to be spent, or even when the fluid level reaches the circulating pump intake. Post-applied drenching solution, which has cascaded down through the apples while still in the bins, is ultimately funneled by concrete berms on the floor of the drencher area into storage tanks. This collected drenching solution is then re-applied (recirculated) onto fresh bins of apples until a decision is made to drain out the solution and make up a new batch.

In **bin-drenching**, typical for processing less than 50,000 bins per year, the drench solution is applied to the individual bins of fruit, which have been removed from the truck, by spraying them while on a conveyor. A bin-drencher usually has one 500 to 1,000 gallon tank.

Packing Processes

When market orders for fresh fruit arrive, the packer opens either a CA or regular cold storage room. Fruit from regular cold storage are typically shipped for up to 90 days after harvest; whereas, CA fruit may be utilized anywhere from 90 to 300+ days after harvest. Whenever a storage room is opened, the stacked bins of fruit are removed, as soon as possible, and brought to the beginning of the packing lines.

Float Tanks

Float tanks are used to remove the fruit from the bins. Float tank wastewater solutions frequently contain one of the following fungicides: SOPP; a chlorine-based disinfectant (i.e. sodium hypochlorite); or TBZ. Infrequently used fungicides include Dichloran® and Captan®. Gowan's Allisan (Dichloran®) label (EPA Reg. #10163-5569) carries use direction for post-harvest use for only apricots, carrots, nectarines, peaches, plums, sweet cherries, and sweet potatoes. Topsin® and Rovral® were included in the previous permit. However, none of the Topsin M® products carry post-harvest use directions on their current labels. Also, the labels for Rovral Fungicide® and Rovral WG® were both revised in 1996 to remove post-harvest uses. Therefore Topsin® and Rovral® will be removed from this permit.

During post-harvest operations, residual concentrations are checked relatively often, since these fungicides are typically adsorbed onto solids and organic sugars, which degrades their effectiveness. The Department has determined there is only minor, if any, chemical carry-over from CA storage to float tank wastewater.

The number of float tanks per packing house usually ranges from one to four, with each ranging in size from 500 to several thousand gallons. These tanks, in contrast to drenchers, are typically discharged weekly or be-weekly, year-round, depending on market demand. As each bin is completely submerged, the fruit floats out, thereby eliminating excessive physical contact which might reduce marketability. The float tank contains water which may be warmed. The water may contain no chemicals or be chlorinated or acidified. Fungicides to control spore growth, if applied, are usually applied on the line. The float solution disinfects the fruit prior to its entering one of two distinct, but similar, packing schemes: (1) non-presize or (2) presize. The interval at which the float solution is emptied varies and depends on each specific packing operation's policy. It is typically done when one of the following occurs: after every week; after reaching a set point such as every 1,000 bins; or when the solution appears dirty.

Additionally, when dealing with pears and the "stone" fruits (i.e. peaches, nectarines and apricots), organic sugars or sodium based salts are added to increase float solution water specific gravity. The substances typically used for this purpose are lignosulfonate, sodium silicate or sodium sulfate. The industry is currently evaluating two new pear float chemicals; potassium phosphate and potassium carbonate. Initial short term trials were held during the 2001-02 season. Longer term trials will follow.

As an alternative to chemical float enhancers, a “floatless” rollover dumper has been developed and installed in several facilities. Bins are placed in a cage and submerged in the tank where they are slowly rotated. A bottom chain moves non-floating fruit up to the exit flume. In addition to eliminating the need for float enhancing chemicals, rollover dumpers also allow the possibility of applying fungicide such as SOPP, in a smaller in-line dip tank which greatly reduces the amount of fungicide used. While rollover dumpers are capital intensive, savings in chemical costs help offset the expense.

Newer fungicidal technologies such as UV, ozonation, and chlorine dioxide have recently been under experimentation. For the past 10 years, one packer has been using a portable ozone generator and dispenser for disinfection of several types of fruit. If proven to be effective, this type of disinfection would eliminate significant chemical use, and in turn, reduced toxics in wastewater discharges. The industry is also beginning to use thermofogging technology to apply antioxidants and fungicides after the fruit has been placed in storage. The industry should continue to investigate these alternative types of disinfection technologies.

Packing lines

Typically, the industry utilizes two distinct, but similar, packing line schemes: non-presize and presize. The non-presize scheme utilizes six steps: floatation, washing, rinsing, waxing, sorting, and final packaging. The presize scheme uses basically the same steps but in differing orders and includes two different presize methods corresponding to whether the presizing occurs before or after CA storage.

Non-presize schemes can be used with any fruit and can be utilized year round. For apples, the fruit are elevated or conveyed out of the float tank solution by means of a continuous large-mesh (approximately 2-inch) chain screen. This accomplishes both the drainage of excessive adhered float solution and the culling of under-sized (unmarketable) fruit. Those marketable apples which remain on the screen will be dumped onto a conveyance system of horizontal cylindrical rollers, laying perpendicular to the process pathway. Depending on their location in the process pathway, these rollers may be plain, covered by sponge, or covered with bristles (forming a brush).

Next, the apples pass underneath a wash spray, which typically contains a detergent and/or another packing line chemical for the removal of soil and hard water spots. The rollers in this area are usually bristle-covered to physically aid in the effectiveness of the wash solution. The fruits are then rinsed with a spray of freshwater to flush off excess chemicals. The rollers at this point typically are uncovered allowing drainage of the contaminated rinse water.

The fruits finally move across a series of sponge-covered rollers which absorb any remains of the rinse water. Sometimes, additional devices (i.e. fans, heat, dehumidifiers) are used to expedite the removal of adsorbed rinse water through evaporation. From this point on, the rest of the packing process is waterless.

Once dried, the apples pass through a wax spray on top of bristle-covered rollers. This type of roller physically assures application of the waxes, either shellac (fast-drying, high gloss), carnauba (usually for export), or a combination of the two. The wax spray may also contain a fungicide such as TBZ, which is used under a number of trade names, including "Mertect". After passing through the waxer the apples continue on top of regular rollers through a forced-air dryer/dehumidifier to assure wax fixation. They are then physically directed into specific lanes of movement, which guide the apples through the sorting process.

In the more modernized packing plants, the fruit next passes underneath either or both of the following opto/mechanical devices: a row of electric eyes which analyze for percent color (of red apples), and a row of precise microprocessor-controlled scales for weight determinations. Each individual fruit is carried by a miniature bucket down parallel sorting lines and gently placed at a specific location, which has been calculated by the microprocessor according to various marketing categories pre-selected by the operator. This is in contrast to older facilities, where the fruit is still hand-sorted for both size and color.

At the end of the packing line, the fruit is given a final visual quality control check and placed into a variety of packaging containers including boxes, bulk bags, totes, etc. These are then put into regular cold storage until time for shipment.

Presize schemes are used mainly with apples and can occur either before or after CA storage. Presize schemes are more extensive and tend to use greater quantities of water than non-presize schemes. This is because fruit conveyance is done by water "flumes" rather than the mechanical devices used in non-presize schemes. A typical presize fruit packer utilizes a number of flumes at any one time, from 6 to 18. Flume dimensions may vary considerably and are 6 inches deep (4 inches of water), 24 inches wide, and from 10 to 40 feet long. The most important factor is that all sorting is completed separately of the packing line, which itself is nearly identical to that of the non-presize scheme.

When presizing occurs before CA, harvested fruit is brought from the fields and drenched with a DPA/TBZ solution if it is to be placed in cold storage after presizing. The fruit is then floated, sorted, and packed or re-binned. The full bins are then placed into CA storage. When market orders arrive, the bins of properly sized apples are retrieved from CA storage and sent through the non-presize scheme (as described above), with exception of sorting, since that has been previously completed.

When presizing occurs after CA storage, binned fruit are floated, washed, rinsed, and sorted. Once the sorting has been accomplished, the apples are re-binned and placed into regular cold storage. When market orders arrive, the bins of properly sized apples are retrieved from storage and sent through the non-presize scheme (as described above), with exception of sorting, since that has been previously completed.

Flumes are generally only used by larger fruit packers (over 50,000 bins/year) for the conveyance of fruit within the processing area. Chlorination is often used to control spore build-up of postharvest decay fungi. However, residual chlorine can potentially combine chemically with other waste products to produce toxic by-products (e.g. chloramines). Investigation should continue into the use of other oxidizers such as chlorine dioxide, UV and ozone.

Wastewater from **pear packing flotation tanks** may contain significant carry-over concentrations of specific gravity enhancers and fungicides from the floatation tanks. Lignosulfonate is especially prone to this, resulting in a potential for significant BOD_5 loading and color carryover in such wastewaters. The dark brown color from lignosulfonate can interfere with UV disinfection systems, pass through a POTW without being treated, and may have other biological impacts to small POTWs. A number of facilities have installed low-volume pre-rinse bars to return as much of the specific gravity enhancers to the float tank as possible.

Packing lines vary between fruit packing houses in the type and quantity of both chemical additives used and wastewater discharged. The fresh fruit packing industry typically uses a linear alkylsulfonate (LAS) based detergent wash to remove natural waxes, dirt and other orchard residues from the fruit prior to further processing. Additional acidic or basic apple wash additives such as acetic acid, phosphoric acid, sodium hydroxide, trisodium phosphate, sodium carbonate, etc. may be used to remove hard water deposits (calcium/magnesium carbonate) which can result from overhead irrigation.

After washing, the apples are rinsed with copious amounts of clean fresh water just prior to entering the dehumidifier, waxer, and dryer. Red apples are typically given an application of either a shellac or carnauba-based wax which may also contain small concentrations of SOPP, TBZ, or Ethoxyquin® to prevent bacterial action. Unwaxed fruit (golden apples and pears) may be treated with an FDA-approved minimal concentration of TBZ or Ethoxyquin® to protect them during shipment to market. Packing line and cleanup wastewaters primarily contain detergents, disinfectants, and wax removing products in concentrations which appear compatible with any allowed TDM.

NON-CONTACT COOLING WATER (NCCW)

Chemicals Used To Prevent Fouling

Non-contact cooling water (NCCW) commonly requires some type of treatment, typically chemical, for preventing biological or physical fouling. The industry uses a wide variety of these chemicals in

various combinations and concentrations. These types of chemical additives, by their nature, have the potential to exhibit toxicity in the receiving water. A study conducted in November 1991 by the USEPA Region 1 Environmental Services Division on the toxicity of non-contact cooling water discharges in Massachusetts and New Hampshire indicated that a majority of the non-contact cooling water discharges tested caused significant acute or chronic toxicity. Test results reported acute toxicity levels as low as LC50=3.4% effluent, and chronic toxicity levels as low as NOEC=2.5% effluent. Possible causes for the toxicity were investigated, including contaminated source water, presence of metals in the discharges, and the use of biocides or cooling water additives in the discharges. No direct correlation was found between these possible causes and the toxicity exhibited in each case. The USEPA concluded that further study of these discharges was warranted and that state permitting authorities should implement monitoring to identify the toxicity sources in these discharges. (Statement of Basis for the NPDES General Permit to Discharge Non-contact Cooling Water Into the Waters of the State of New Jersey, NPDES Permit No. NJ0070203, State of New Jersey, Department of Environmental Protection and Energy, Division of Water Quality, Wastewater Facilities Regulation Program, 401 East State Street, CN-209, Trenton, New Jersey, 08625.)

Given the large number of chemicals and the potential synergistic effects of their combinations, it would not be practical to regulate these additives individually in the general permit. Whole Effluent Toxicity (WET) testing is designed for this situation. The previous permit specified a WET screening test using the rotifer *Brachionus calyciflorus*. Facilities that wish to discharge NCCW containing additives to surface waters must pass this WET screening test to qualify for coverage under for that discharge the general permit. Those facilities which do not pass the screening test and wish to continue to discharge NCCW containing additives must select an alternate additive regime and retest, select an alternate TDM or apply for coverage under an individual NPDES permit. This WET screening test will also be used to verify the narrative toxicity criteria. WET testing is discussed in more detail on page 68 in the “TDM - Surface Water” section of this fact sheet.

NCCW which contains priority pollutants, dangerous wastes or toxics in toxic amounts, are only permitted to be discharged to lined evaporative lagoons. NCCW which does not contain priority pollutants, dangerous wastes or toxics in toxic amounts, are permitted to be discharged to any of the six TDMs.

Good process control, such as an automatic metering system, is essential in ensuring that proper dosing cycles are maintained. Using the minimum amount of chemical needed to effectively control fouling not only is better for the environment but also saves the facility money. Alternative NCCW treatments, both new chemicals and non-chemical treatments, should continue to be investigated.

Total Dissolved Solids (TDS) in NCCW

A number of facilities in the fresh fruit packing industry use NCCW to provide cooling for cold storage. There are a variety of water sources for cooling systems, including wells, surface waters, and municipal water systems. The total dissolved solids (TDS) content of the source water can be quite high, sometimes even exceeding the Ground Water Quality Standard criterion of 500 mg/L established in Chapter 173-200 WAC, as measured in the ground water. Evaporative losses during the cooling process concentrate the naturally occurring dissolved solids in the source water, which sometimes result in TDS values in the discharge which exceed the criterion.

From 2000 to 2002, fifty-eight facilities reported TDS values for NCCW discharges to dust abatement, land application, or percolation systems. Of these facilities, 21 (36%) reported TDS values below the groundwater standard of 500 mg/L. An additional 24 (38%) reported values between 500 and 1000 mg/L. The maximum reported value was 4450 mg/L. Average TDS loading ranged from 0.1 to 89 lbs/day. Thirty-eight (66%) of the facilities discharged less than 5 lbs/day. Maximum discharge volumes ranged from 5 to 12,800 gallons per day, with 35 (60%) of the facilities below 1000 gallons per day.

Discharge of NCCW is seasonal, with the peak discharges occurring during the fall when cold storage rooms are being filled. Discharges decrease dramatically after the storage rooms have been filled and the ambient temperatures fall and during the summer months when the storage rooms are empty. A variety of distribution systems are used to apply NCCW, including sprinklers, surface flow, and mixing with irrigation systems. Application rates of NCCW vary but are limited to 1800 gallons/acre/day (0.066 inches/acre/day) to dust abatement and 6000 gallons/acre/day (0.22 inches/acre/day) to land application.

TDS is generally considered a conservative pollutant. Given the complexity of soil forms and aquifer/soil interactions it is difficult to either generalize or predict the impact of land application of TDS on aquifer concentration. However, assuming a value of 3 inches of annual precipitation available for dilution, complete evaporation of the applied NCCW and no other sources of TDS, an annual applications rate of 350 lbs or less of TDS/acre/year would result in a maximum TDS concentration of 500 mg/L being discharged to the ground water from this source.

TDS is a secondary criterion that was set at the drinking water standard of 500 mg/L, which is the approximate concentration at which a salty taste could be detected. The main concern with TDS is the aesthetic value of the water. The health risk associated with TDS, especially at the levels reported by most Permittees is relatively low.

Given the reported TDS concentration levels, the implementation of BMPs, and the relatively low volumes of application, the Department has determined a TDS effluent limit for discharges of NCCW to dust abatement, land application, and percolation systems is unnecessary. Quarterly monitoring of TDS for discharges to these TDMs will continue in this permit. Systems should be operated to reach a reasonable balance between TDS concentrations and water conservation.

If the department determines a facility is repeatedly discharging NCCW which poses a risk of significant degradation to groundwater due to site specific factors, additional monitoring may be required through an administrative order and that facility may be required to use an alternative TDM or apply for an individual wastewater discharge permit.

Sanitary Wastewater

Discharge of sanitary wastewater directly to either surface or ground waters of the State is not allowed under this permit. These wastes must be treated in an appropriate manner, typically being sent to either the local POTW or a specifically engineered on-site sewage treatment device (i.e. septic system). The practice of commingling sanitary and process wastewaters for any discharge other that to a POTW is prohibited.

Stormwater

Stormwater, as well as some process wastewaters (i.e., NCCW), may be discharged to surface or ground waters. However, if those stormwater or process wastewaters have been contaminated or treated with priority pollutants, dangerous wastes (i.e. antifreeze) or toxics in toxic amounts, then they must be appropriately treated and discharged in manner consistent with conditions in the general permit. EPA regulations concerning storm waters are contained in 40 CFR Parts 122, 123, & 124.

Pollution Prevention / Source Reduction

The industry should continue to examine the possibility of alternatives to reduce the need for, or cost of, wastewater treatment and/or disposal. There is a great deal of pollution prevention information available with details on way to reduce or eliminate pollutants. Such methods include:

1. The **alternative chemical** substitution of environmentally safer products may simplify wastewater treatment and/or disposal. Although chemical substitution may sometimes initially appear to be more expensive, it may over time, result in substantial savings. For example, the relative cost coefficient for an environmentally safer product may be greater when based on disinfection only. However, when additional costs associated with treating any product residuals and by-products to achieve permit compliance are taken into account, it may make the more expensive environmentally safer product more cost effective overall.

2. The use of **alternative technology** methods which may have economic advantages over normal procedures. For example, the useful lifespan of a specific chemical or process water may be increased substantially through filtration and recycling, thereby reducing both production and/or disposal costs. Technologies for employing reclamation/reuse are also justified in order to achieve BAT and AKART for reducing waste loads in the effluent. Floatless pear dump tanks, counter-current washes, pre-rinses, and other water management techniques may also be cost effective ways of reducing chemical and water usage. Integrated fruit production (IFP) may reduce the number or amount of chemicals needed. Thermofogging technology may reduce the need for drenching.

NEW CHEMICALS BEING EVALUATED

Pear Float Chemicals

The industry is currently evaluating three new pear float materials: two formulations of potassium phosphate (pH 11.3 and pH 7.0) and potassium carbonate (pH 11.3). A multi-year study was designed which defined trial protocols to determine the discharge levels and impacts of these chemicals upon various TDMs, principally POTWs. First year results indicated high levels (113 mg/L to 406 mg/L) of phosphorus in the discharges containing the two phosphate based chemicals. Although Washington State does not currently have a numerical water quality criterion for phosphorus in flowing water, based upon the USEPA recommendation for flowing surface waters of 0.1 mg/L total phosphorus it was estimated that the likely packing house discharge limit would be at most in the 1 to 10 mg/L range and possibly lower by a factor of 10. Given the high trial results it appeared that pretreatment for phosphorus would be necessary. The industry decided to postpone further trials on the potassium phosphate formulations until it can be determined if cost effective phosphorus removal pretreatment is

available. Only one trial was run using the potassium carbonate in the first year. Trials will continue throughout this permit cycle and the results will determine if these floats will be included in the next permit.

Fungicides

The industry is currently evaluating two new fungicides, fludioxinol (Scholar®) and pyrimethanil (Penbotec®). Trials should be conducted throughout this permit cycle and the results will determine if these floats will be included in the next permit.

CHEMICALS USED

Note: References to human health refer to those risks associated with impacts of wastewater discharges to waters of the State. It does not refer to risks associated with exposure to any chemical additive or ingestion of any chemical residue on the fruit.

Calcium chloride (CAS# 10043-52-4) is used as a post harvest drench at approximately 2200 mg/L (equivalent chloride concentration = 1406 mg/L) to help prevent disorders caused by low calcium levels, such as bitterpit. It may be used alone, but is most often used with DPA (anti-scald) and/or TBZ (fungicide). It is relatively non-toxic to aquatic organisms (LC50 = 900 mg/L for *Oncorhynchus mykiss*) when used in minor concentrations. Human health risks appear to be moderate in that it is a powerful irritant of skin and respiratory systems. In Canada, 50 mg/L has been suggested as the drinking water limit for this chemical. Calcium chloride produces heart failure in mice at a concentration of 280 mg/L. In countries where it is used instead of salt for ice melt, there have been reported serious losses of wild animals drinking slush (containing concentrated calcium chloride) at roadsides. According to literature, this chemical does not biodegrade.

Chloride is a secondary groundwater criterion with the main concern being the aesthetic value of the water. The criterion was set as a drinking water standard at the point where a salty taste could be detected. There is a minimal health risk associated with chloride. Chloride is considered a conservative pollutant in that the only "treatment" it will receive is dilution.

Drencher wastewater containing calcium chloride may be discharged only to lined evaporative lagoons, dust abatement, and land applied. Since calcium chloride is the only source of chlorides in drencher water (except for background chloride), the best way to control chlorides is through the use of best management practices, including specifying a maximum use concentration and a maximum annual application rate. The maximum use rate will be the label use rate of 2200 mg/L of calcium chloride. The maximum annual application rate was determined using a biased model to determine the annual application rate of calcium chloride which could be diluted by dormant season precipitation to a concentration which would be protective of the groundwater quality. The model indicated wastewater containing calcium chloride used at the label rate of 2200 mg/L, with a maximum annual and daily application rate of approximately 1800 gal/acre would be protective of groundwater quality. See the 1994 fact sheet for details on this model.

Chlorine-based Chemicals

Calcium hypochlorite (CAS# 7778-54-3)**, sodium hypochlorite** (CAS# 7681-52-9), **Chlorine gas** (CAS# 7782-50-5) and other chlorination chemicals are very common disinfectants used during the packing of fruit. Typically, sodium hypochlorite is used at concentrations ranging from 5 to 150 ppm. The majority of these disinfectants are highly toxic to aquatic organisms.

Chlorine dioxide (CLO_2) (CAS# 10049-04-4) is a powerful oxidizing agent used as an alternative disinfectant for chlorine. It has 2.5 times the oxidizing capability of chlorine, and generates no chloramines or tri-halomethanes and inhibits the formation of chloroform. It is a greenish-yellow gas which is typically produced on-site due to its explosive nature: at large concentrations (above 10%) in air it may explode upon contact with any ignition source. Oral rat toxicity studies show an LD50 = 105 mg/kg. Industry sources indicate use concentrations are 1.0 – 2.0 mg/L. Off-gassing of chlorine can occur with the use of chlorine dioxide, so worker health should be considered. Human health concerns with the wastewater should be low when used at normal use concentrations.

Residual chlorine concentrations are of concern since they are extremely toxic/reactive for aquatic organisms. Sodium hypochlorite LC50 = 0.080 mg/L for *Pimephales promelas, calcium hypochlorite* LC50 = 0.11 mg/L 48hr for water flea, *Daphnia magna*: and chlorine LC50 = 0.017 mg/L for *Daphnia magna.* Chlorine can form highly toxic chloramines upon contact with ammonia and/or nitrogenous compounds. However, fruit packing wastewaters generally lack significant amounts of ammonia and/or nitrogenous compounds. Residual chlorine, in the absence of ammonia, may also produce chloroform due to its reactivity with organic material. Residual chlorines have a strong adsorption to soil and are not expected to leach.

The fruit packing industry is encouraged to employ pollution prevention and waste reduction techniques, or chemical substitution, regarding chlorine-based fungicide usage in order to discourage high total residual chlorine concentrations. These techniques should minimize the formation of potentially toxic or environmentally unsound wastestreams, and thereby protect the water quality of State ground and surface waters.

Dechlorination must be done if residual chlorine concentrations exceed the effluent limits. This can include such techniques as volatilization or chemical dechlorination with reducing agents such as sodium sulfite or other chlorine neutralizing chemicals.

The most stringent Total Residual Chlorine discharge limit for dust abatement and land application will be the dangerous waste regulation calculated maximum concentration limit of 10.0 mg/L (total residual chlorine). Discharges to POTWs will be limited to 0.50 mg/L of total residual chlorine. Discharges to percolation systems will be limited to 5.00 mg/L. Discharges to surface water will be limited to 0.019 mg/L, which is the acute freshwater water quality criterion. However, due to the lack of a reasonably priced field test kit which can detect total residual chlorine to this level, the established Quantitation Level (analytical detection limit) of 0.05 mg/L, when using the DPD/colorimeter test method, 40 CFR Part 136, serves as the enforceable limit for this parameter. A measured value between 0.019 and 0.05 mg/L may not be a violation due to the uncertainty of the test method, and shall be reported as "less than 0.05 mg/L".

Captan® (CAS# 133-06-2), (4-cyclohexane-1,2-dicarboximide,N-((trichloromethyl)thio)), is an infrequently used non-systemic fungicide, principally applied on stone fruits and berries. It can also be

applied as a postharvest dip to apples, cherries and pears. Captan® is utilized at concentrations up to a maximum of 1,200 mg/L. It is very highly toxic to aquatic organisms (LC50 = 0.073 mg/L 96hr for *Oncorhynchus mykiss*), while acute oral rat toxicity studies show an LD50 range from 8,400 to 15,000 mg/kg. It readily adsorbs onto, and is practically immobile in, soil and is unlikely to leach. It degrades by both chemical and biological methods. Captan®, up to 250 mg/L, is not persistent and in moist soil has a half-life from 1 to 5 days; however, in dry soil up to 2 months. Captan® also has a half-life in water from 10 minutes to 12 hours; however, due to its toxicity it is prohibited from entering waters of the State. Human health risk appears to be moderate due to low dermal toxicity and carcinogenic potential.

The strictest discharge limit for dust abatement and land application is based on the dangerous waste regulation calculated maximum concentration limit of 10.0 mg/L. Due to aquatic toxicity data, Captan® is prohibited from discharge to any TDM other than a lined evaporative lagoon, dust abatement or land application.

Dichloran® (CAS# 99-30-9), (2,6-dichloro-4-nitroaniline), is another infrequently used fungicide, principally applied on stone fruits and berries, by way of the product BOTRAN® (a combination of DICHLORAN® and CAPTAN®). Toxicity studies have not been found, but it is assumed to be very toxic to aquatic organisms due to, at least, its CAPTAN® component. The chemical is tightly adsorbed onto soil particles and organic matter (Koc = 804) with a corresponding half-life from 1-3 weeks under flooded conditions, and 13-30 months under dry soil conditions. It is not expected to leach. It has a hydrolysis half life of 72 days, an aerobic soil half-life of 549 days, and an anaerobic soil half-life of 66 days. This potentially long half-life supports DICHLORAN® being classified as highly persistent and non-biodegradable. Any available degradation is probably due to microbial action, which must develop over time. The addition of microbial-enhancing substances (such as glucose, alfalfa, and rice straw) decreases its persistence in soil. In water, DICHLORAN® has shown no tendency to hydrolyze or volatilize. Human health risk is presumed to be moderate due to low acute toxicity, low dermal toxicity, "No Effect" level of 1,000 mg/kg seen in rat toxicity studies, and low carcinogenic potential.

The strictest discharge limit for dust abatement and land application is based on the dangerous waste regulation calculated maximum concentration limit of 10.0 mg/L. Due to its CAPTAN® component and assumed aquatic toxicity, DICHLORAN® shall also be prohibited from discharge to any TDM other than a lined evaporative lagoon, dust abatement or land application.

Diphenylamine (DPA) (CAS# 122-39-4), is the most commonly used product in drenching solutions and is used at concentrations up to 2,200 mg/L. It is a chemical anti-oxidant that prevents the brown "scald" discoloration of apples, and may be used either alone or in combination with TBZ or Ethoxyquin®.

On September 30, 1997 DPA was approved for reregistration for postharvest use by the USEPA. The Reregistration Eligibility Decision (RED) states that DPA appears to be very labile in the environment, with aerobic soil metabolism and aqueous photolysis being important. Under aerobic soil conditions DPA degrades rapidly (half-life < 1 day). When exposed to light in water transformation half-life is 4.39 hours. Relatively little information is available about the transformation products of DPA under aerobic soil metabolism or aqueous photolytic conditions. However, it appears the ultimate fate of DPA residues is mineralization and soil binding. The mobility of DPA ranges from somewhat mobile

in clay soil to mobile in other soil types. (EPA, Reregistration Eligibility Decision (RED) Diphenylamine, EPA738-R-97-010).

The RED indicates DPA is moderately toxic to fish (96hr LC50=2.2 (*Oncorhynchus mykiss).* A Department study conducted in December 1988 determined DPA product toxicity of LC50 = 2.6 mg/L (*Oncorhynchus mykiss)*. This same study also found that actual drencher wastewaters had an average LC50 = 1,315 mg/L (*Onchorhyncus mykiss*). Oral rat studies have shown an LD50 = 3,000 mg/kg. Human oral studies have shown that the lowest published lethal dose is 500 mg/kg. DPA readily adsorbs onto soil (Koc = 119), exhibiting low motility and is not expected to leach. It undergoes rapid degradation in the presence of ultraviolet (UV) light and air, having a half-life of approximately 30 days in unamended soil. However, humic substances enhance the degradation process, showing a half-life of approximately 10 days.

DPA has been found to interfere with POTW processes at 10 mg/L, and since actual discharges have significantly interfered with POTWs in the past, this method of disposal is prohibited.

Discharges to a lined evaporative lagoon will not be subject to concentration limits. The most stringent discharge limit for both dust abatement and land application will be the maximum normal use concentration of 2,200 mg/L. Discharges to any TDM other than a lined evaporative lagoon, dust abatement or land application is prohibited.

The Department will not require an annual analysis of this parameter, for the above TDMs, if the Permittee complies with all the terms and conditions of the general permit and applies this wastewater at a rate of not more than 1,800 gallons/acre/day, and no more frequently than every other day, 30 times per year. The permit requires the permittee to maintain records of all drencher water discharges using either the "Batch Mix Record" form or an equivalent form which records the following information: 1) batch number, 2) date the batch was mixed, 3) person responsible for making the batch, 4) total batch volume, 5) name and amount of all chemicals added to the batch, 6) date spent solution was discharged, 7) disposal site ID, 8) volume of spent solution discharged, 9) disposal area, 10) calculated application rate, and 10) TDM inspection results and comments about any abnormal conditions. Removing the annual DPA analysis is reasonable because: 1) past compliance rate has been good (81% in compliance, 10% non-report, 20 of 23 effluent violations within 10% of compliance, and the maximum violation was a 28% exceedance), 2) permittees have incentives to minimize DPA use because of the high cost of the chemical and the risk to fruit from chemical overexposure, and 3) the permittees and chemical suppliers do frequent testing of the DPA levels for process control.

Ethoxyquin® (CAS# 91-53-2) is an antioxidant used to control pear scald. This chemical is typically used at a concentration of approximately 2,700 mg/l and should not be used in conjunction with other chemicals. Specific aquatic toxicities, effects on POTWs, and environmental degradation processes are not known. Single 500 mg/kg oral dose to rats showed serious ultra structural changes in their livers. The lowest published lethal dose to humans was 500 mg/kg. Human health risks appear to be moderate, as cases of skin irritation upon contact have been reported.

The strictest discharge limit for both dust abatement and land application will be the maximum normal use concentration of 2,700 mg/L. The Department will require an annual analysis of this parameter, for the above TDMs, if the Permittee complies with all the terms and conditions of the general permit

and applies this wastewater at a rate of not more than 1,800 gallons/acre/day, and no more frequently than every other day, 30 times per year. Since specific aquatic toxicities, environmental fate, and effects to POTWs are not known, the effluent limits are set by best professional judgment. Discharges to POTWs and to percolation systems will be limited to 50.0 mg/L and 5.00 mg/L of Ethoxyquin®, respectively.

Ethoxyquin® is a candidate for EPA reregistration in 2004. This permit may be modified if the reregistration document or other information indicates the limits and BMPs specified in this permit are not adequate to protect State waters.

Lignosulfonate (CAS# 8061-51-6), a specific gravity enhancer, is used to float pears and stone fruits at the beginning of packing operations. The normal float tank concentration is 12% (120,000 mg/L) lignosulfonate, of which 50% or 60,000 mg/l are solids. The BOD to solids ratio is generally 0.3 to 1 resulting in approximately 18,000 mg/L BOD_5 in the float tank solution. At these discharge concentrations this chemical is extremely toxic, even though the chemical is usually considered non-toxic (LC50 = 2,400 mg/L for *Oncorhynchus mykiss*). However, other process wastewaters downstream of the float tank will typically contain less lignosulfonate and therefore have a reduced potential for impacting the environment. Oral rat toxicity studies indicate an LD50 = 28,500 mg/L. The high BOD_5 quality of float tank discharges would be potentially detrimental under all TDMs except for dust abatement, since lignosulfonate has a strong affinity to adsorb to soil.

The strictest discharge limit for dust abatement will be the normal float tank use concentration of 12% or 120,000 mg/L lignosulfonate . The Department will not require analysis of this parameter, for the above TDM, if the Permittee complies with all the terms and conditions of the general permit.

Other lignosulfonate-containing process discharges shall be allowed to be discharged to lined evaporative lagoons, POTWs which do not use UV disinfection, land application or dust abatement. There is a strong potential for effluent limit violations to these TDM limits due to spills and carryover into the rinse water of this extremely high BOD_5 and dark colored material. Odor control measures may be necessary for discharges to lined lagoons due to the potentially high BOD. At several wastewater treatment facilities sufficient lignosulfonate entered the rinse water to adversely affect the operation of the POTW, either by the BOD_5 exceeding the limits or by the color interfering with the UV disinfection system and passing through the system untreated. Measures must be taken to ensure that such discharges shall not exceed any limit given for any specific TDM or cause any interference or by-pass at a POTW. Such measures can include process and source control methods such as countercurrent washing systems, pre-rinse bars, collection and return of tank overflow and other runoff to the dump tank, recycling, dry or floatless dump systems, alternative chemicals, or any other new pollutant reduction techniques that become available. This permit prohibits the discharge of both float tank water and rinse water containing lignosulfonate to POTWs which have UV disinfection.

At such time that scientific evidence would indicate that different limits and/or TDMs would be possible without causing significant potential to violate any State or Federal law or standard, then the general permit may be modified accordingly.

Ozone, the tri-atomic molecule of oxygen, is a bluish gas which has been used for disinfecting drinking water since 1893. The effectiveness of ozone is not as dependent on pH and temperature as is chlorine, nor does it require extensive contact time. Ozone does not react appreciably with ammonia

and produces no known toxic by-products. It has a disinfection power (potential) of, at least, twice that of chlorine. Experiments at the Hood River Experiment Station, Oregon yielded important and positive data about this disinfectant concerning the fruit packing industry. These experiments found that ozone at 0.3 ppm, or chlorine at 54 ppm, in dump (float) tank water controlled *Penicillium* and *Cladosporium* to the same levels. An ozone level of 0.5 ppm killed approximately 80% of the spores in an exposure time of three (3) minutes (Spotts RA, "Use of Ozone for Decay Control", Proceedings of the 7th Annual Washington Tree Fruit Postharvest Conference, March 27 and 28, 1991). Ozonation is not known to have caused any injury to fruit in any situation to date.

Packing Line Chemicals

Packing lines vary between fruit packing houses in the type and quantity of both chemical additives used and wastewater discharged. The fresh fruit packing industry typically uses linear alkylsulfonate (LAS) based detergent washes to remove natural waxes, dirt and other orchard residues from the fruit prior to further processing. Additional acidic or basic apple wash additives such as acetic acid, phosphoric acid, sodium hydroxide, trisodium phosphate, sodium carbonate, etc. may be used to remove hard water deposits (calcium/magnesium carbonate) which can result from overhead irrigation.

After washing, the apples are rinsed with copious amounts of clean fresh water just prior to entering the dehumidifier, waxer, and dryer. Red apples are typically given an application of either a shellac or carnauba-based wax which may also contain small concentrations of SOPP, TBZ, or Ethoxyquin® to prevent bacterial action. Unwaxed fruit (golden apples and pears) may be treated with an FDA-approved minimal concentration of TBZ or Ethoxyquin® to protect them during shipment to market. Packing line and cleanup wastewaters primarily contain detergents, disinfectants, and wax removing products in concentrations which appear compatible with any allowed TDM.

Packing line chemicals are not all usually applied at any single packing house. Each fresh fruit packer uses only those chemicals which are most appropriate through past experience. The chemicals are typically applied by a spray and are considered to be a minor component of the total wastewater flow discharged from the fresh fruit packing lines. At normal concentrations, the packing line chemicals would probably not be detrimental under any of the TDMs allowed by the general permit, except surface waters. Direct discharge of wastewater containing packing line chemicals is allowed to any TDM except surface water. Discharges of wastewater containing only linear alkyl sulfonate (LAS)-based soap, wax or acidic or basic washes may be discharged to surface water only after having received a minimum of secondary treatment. For this permit secondary treatment is defined as aerated biological treatment followed by filtration or sedimentation, and pH adjustment, if needed. There is extensive literature showing LAS-based materials readily undergo primary and ultimate biodegradation under a wide variety of wastewater treatment processes and that LAS does not accumulate in river water or sediments. No additional monitoring of these chemicals beyond that required of all surface water discharges is required except watching for foaming at the outfall during regular inspections. The discharge limits is the normal label use rates for each chemical. For increased efficiency High Pressure Low Volume (HPLV) spray-head technology should be considered for use on spray systems.

Silicone defoaming agent (organosilicone fluid emulsion) is typically used up to a maximum of 100 mg/L, which corresponds to the maximum FDA limit of 10 mg/L silicone solids. It has a pH between 4 to 5. Human health risks appear to be low as the product used is FDA food grade.

The strictest discharge limit for any application will be the maximum normal use concentration of 100 mg/L. The Department will not require analysis of this parameter if the Permittee complies with all the terms and conditions of the general permit.

Sodium silicate (CAS# 1344-09-8), a specific gravity enhancer, is used at a starting concentration of 30,000 ppm. It is considered mildly toxic, with an LC50 = 113 mg/L for *Daphnia magna*. Oral rat toxicity studies indicate an LD50 = 13 mg/kg. Sodium silicate has been detrimental to some POTW processes due to its abrasiveness and corrosive nature. However, this same characteristic may have significant road maintenance qualities that would be appropriate to dust abatement.

The strictest discharge limit for dust abatement and land application would be the maximum normal use concentration of 30,000 mg/L. Sodium silicate is prohibited from discharge to any TDM other than a lined evaporative lagoon, dust abatement, or land application. Untreated wastewaters containing sodium silicate will normally be high in pH (10 to 11) and will therefore need to be neutralized to at least 9.0 pH either before or immediately after application.

Sodium sulfate (CAS# 7757-82-6), a specific gravity enhancer, is also used at a starting concentration of 30,000 ppm. It is relatively non-toxic, with an LC50 = 1,190 mg/L 48 hr for *Daphnia magna*. The FDA has classified this chemical as an indirect food additive, due to being poorly absorbed into the gastrointestinal tract.

Sulfate has the potential to be corrosive to metal fixtures and concrete sewer pipes. Sulfate can be converted to sulfide under anaerobic conditions. Under normal domestic sewage pH levels one-quarter to one-third of the sulfide exists as molecular hydrogen sulfide (H_2S), which is released to the air and deposited on the sewer walls. Bacteria on the walls convert the H_2S to sulfuric acid which corrodes the concrete pipe. The H_2S can also directly react with metals, including iron, steel, and silver contacts in motor controls (Corrosion Below: Sewer Structures, Kenneth and Karl Kienow, Civil Engineering, September 19).

The strictest discharge limit for dust abatement, land application and percolation will be the State's ground water quality standard of 250 mg/L. To reduce the corrosion risk to sewer systems the discharge limit to POTWs will be 250 mg/L. Sodium sulfate is prohibited from discharge to any TDM other than a lined evaporative lagoon, dust abatement, land application, POTW, or percolation systems. Wastewaters containing sodium sulfate will normally be high in sulfate and may need desulfonation prior to discharge to meet the effluent limits.

SOPP (sodium ortho-phenylphenol) (CAS# 90-43-7) is a fungicide commonly used in float tanks at concentrations from 1,000 to 6,000 ppm. It is used primarily with one of the three pear float enhancers, lignosulfonate, sodium sulfate, and sodium silicate, or may be used in a separate in-line dip tank.

This chemical has proven to be highly toxic to aquatic life at concentrations typically discharged in the fruit packing industry (LC50 = 5.99 mg/L for *Pimephales promelas*). Acute oral rat toxicity studies show an LD50 = 1,160 mg/kg. In experiments with activated sludge systems, SOPP has caused upsets at slug loadings of 50 mg/L or greater. Human health risk is not-determined, but is suspected to be moderate due to the toxicity data for pure phenol, which is chemically similar.

Chlorine should not be used in conjunction with SOPP because the chlorine would destroy the SOPP and possibly form polychlorobiphenyls (PCBs). The chlorine would not be able to attain a free disinfection residual that would be sufficient to destroy postharvest pathogen spores. (Vucenta, Jasenka et al., "Investigation into Effluent Discharges from Washington Fresh Apple Packers", Volume 1, USEPA Contract No. 68-03-2578, September 1980, 110 pg).

At lower than 10 mg/L concentrations, SOPP is easily and rapidly biodegradable, with a half-life of approximately 7 days under aerobic conditions in both soil and water.

Discharges to POTWs will be limited to 50.0 mg/L of SOPP. Individual POTWs may set more stringent limits if they feel it is necessary to protect their operation. Discharges to percolation systems will be limited to 6.00 mg/L of SOPP, the LC50 toxicity value. The tiered application rate for land application established in the previous permit remains in effect. Application at these rates will be limited to dust abatement and land application. Application frequency will be limited to once per week to reduce the risk of the SOPP inhibiting the microbial action needed for it degradation. The maximum SOPP concentration will be set at the normal maximum use concentration of 6000 mg/L for the same reason. These limits are subject to change if additional research becomes available, or if any biological testing or monitoring indicates SOPP concentrations at these levels are not being adequately treated.

Thiobendazole (TBZ) (CAS# 148-79-8) TBZ is the principal fungicide used to control blue and grey molds. It is typically used in conjunction with DPA in the drencher solutions at concentrations of up to 615 mg/l, the maximum label use rate. It can also be used in a line spray or added in small concentrations to the wax coating to prevent bacterial action.

TBZ is a General Use Pesticide (GUP) and is in EPA toxicity class III – slightly toxic. It was declared eligible for registration by the EPA in 2002. It is moderately toxic to aquatic life (Mortality = 10 mg/L 24 hr for *Oncorhynchus kisutch*) and is not expected to accumulate in aquatic organisms. TBZ has demonstrated POTW toxicity at slug-loads above 50 mg/l. The City of Wenatchee is currently conducting a study to determine if TBZ is inhibiting nitrification at that plant. The effect of TBZ on Oral rat studies have shown a LD50 = 3,330 mg/kg. Human health risk appears to be low. TBZ is used to treat humans for several helminthes species, such as roundworms, and is also used medicinally as a chelating agent to bind metals.

TBZ is stable to photolysis and hydrolysis in soil. It does not metabolize significantly in soils under aerobic and anaerobic conditions. The field half-life for TBZ was reported in one study as 403 days. However, TBZ is readily adsorbed onto, and is practically immobile, in soil. Its affinity for soil binding increases with increasing soil acidity. EPA has concluded that due to its affinity for soil and high soil/water partitioning coefficients, the risk for leaching into ground water and runoff into surface water are low.

TBZ photodegrades in water with a half line of approximately 29 hours when exposed to a xenon lamp for 96 hours. Given TBZ low solubility it is most likely to be bound to sediment.

The most stringent discharge limit for both dust abatement and land application will be the maximum normal drencher use concentration of 615 mg/L. The Department will require an annual analysis of this parameter for the above TDMs, if the Permittee complies with all the terms and conditions of the

general permit and applies this wastewater at a rate of not more than 1,800 gallons/acre/day, and no more frequently than every other day, 30 times per year. Discharges to POTWs will be limited to 50.0 mg/L of TBZ; whereas discharges to percolation will be limited to the aquatic toxicity value of 10 mg/L.

Ultraviolet light (UV) has been studied as a disinfectant since 1893. It includes light with wavelengths from 150 to 4,000 Angstroms, with 2,537 Angstroms being the most effective. UV's disinfecting properties are due to its direct reactions with the nucleic acids in an organism's cellular structure. The amount of energy (uW/sq.cm.) needed to destroy a specific bacterium, fungi, or fungal spore is quite variable. Other factors which limit UV disinfection are: (1) the water medium itself; (2) the amount of turbidity; and (3) the amount of organic matter present. Small-scale projects have shown that UV is easy to install and has the benefit of not producing any toxic residuals or by-products. Given these advantages, the industry should continue to investigate UV technology to determine if advances will make it a viable disinfection option.

Wax (carnauba or shellac) coatings, with/without fungicide additives, are often applied to give fruit physical protection and an attractive appearance for shipment. Again, these products are spray applied and are assumed to be a minor contributor to overall wastewater discharges and thus not detrimental to any of the TDMs. Human health risk appears to be low, as these are typically food grade additives.

Biological control agents a limited number of facilities are using a biological agent for the control of mold and rot on pears, apples, and cherries. At present the only agent in use is Bio-save®, which is produced by Ecoscience and is based on bacterium strains of *psuedomonas syringae*. Other similar agents based on yeasts are also being developed.

Bio-Save® fungicides are based on naturally occurring, non-pathogenic, non-genetically engineered bacterium strains of *Psuedomonas syringae*, which were isolated from apple and pear orchards in the US. It is generally applied to apples and pears via an overhead drip or spray, or over donut rolls or brushes. This application results in minimal discharge, basically during clean-up. It can also be used in a drench. Once mixed for application, Bio-Save® has a shelf life of 24 to 48 hours. It is killed on contact with sanitation cleaners such as bleach and quaternary ammonium compounds.

Evidence suggests Bio-Save® controls fruit infection by out-competing the pathogen for nutrients at the wound site on fruit surfaces. There is no evidence of significant antibiotic production. It has received registration by USEPA and is exempted from all residue tolerance levels granted by USEPA. According to the Codex Committee on Pesticide Residues, Bio-Save® does not represent a health concern and has no requirement of MRLs (maximum limits for pesticide residues) (an information packet received 10-30-98 from Lucie Grant, Director of Technical Operations, EcoScience, PO Box 3228, Orlando, Florida, 32802. (407) 872-2224). The department has determined monitoring for Bio-Save, or other similar products, is not needed at this time. The department will continue to work with the manufacturer to track development and use of these products. Should additional information indicate these types of products pose a significant risk to water quality, the permit may be modified to included additional monitoring, BMPs, or effluent limits.

TREATMENT / DISPOSAL METHODS (TDMS)

Selection of TDMs

The Department has studied the characteristics of wastewater discharges from the fresh fruit packing industry. The TDMs discussed below were designed for the protection of: waters of the State; POTWs; and human health shall not conflict with stricter existing zoning, land use, and/or local health department regulations.

The general permit requires the Permittee to identify all of the wastestreams to be discharged by the facility. The Permittee must then select for each wastestream, the appropriate TDM based upon the chemicals contained in the wastestream (see Table 2).

A fresh fruit packing facility may use any of the following six allowed TDMs, as appropriate:

1. **Lined evaporative lagoons**
2. **Dust abatement**
3. **Publicly Owned Treatment Works (POTW)**
4. **Land application**
5. **Percolation systems**
6. **Surface water**

A facility wishing to obtain coverage under the Fresh Fruit Packing General Permit must comply fully with all applicable specifications and BMPs set forth in the terms and conditions of this general permit. Failure to do so may result in a permit violation and/or constitute the need to obtain an individual NPDES or State Wastewater Discharge permit.

Table 2. Selection Of Treatment / Disposal Methods (TDMs)

WASTE-WATER SOURCE	CHEMICALS USED		1 LINED LAGOON	2 DUST ABATEMENT	3 POTW	4 LAND APPLICATION	5 PERCOLATION SYSTEM	6 SURFACE WATER
DRENCHER OR DIP TANK	CONTAINING ANY ADDITIVE INCLUDING: DPA, TBZ, ETHOXYQUIN, CALCIUM CHLORIDE, CAPTAN, DICLORAN, SOPP		YES	YES		YES		
APPLE OR STONE FRUIT FLOAT, FLUME OR RINSE	NO CHEMICALS OR ONLY CHLORINE BASED FUNGICIDES		YES	YES	YES	YES	YES	YES
	WASHING / WAXING PRODUCTS ONLY OR WITH CHLORINE BASED FUNGICIDES		YES	YES	YES	YES	YES	CONDI-TIONAL [1]
	NON-CHLORINE BASED FUNGICIDES (TBZ), EXCLUDING CAPTAN AND/OR DICHLORAN		YES	YES	YES	YES	YES	
	CAPTAN AND / OR DICLORAN		YES	YES		YES		
PEAR PACKING	LIGNOSULFONATE W/WO SOPP	FLOAT		YES				
		RINSE	YES	YES	YES [2]	YES		
	SODIUM SILICATE [3] W/WO CHLORINE OR SOPP	FLOAT	YES	YES		YES		
		RINSE	YES	YES		YES		
	SODIUM SULFATE [4] WITH CHLORINE	FLOAT	YES	YES		YES		
		RINSE	YES	YES	YES	YES	YES	
	SODIUM SULFATE [4] WITH SOPP	FLOAT	YES	YES		YES		
		RINSE	YES	YES	YES	YES	YES	
	FLOATLESS DUMPER WITH SOPP	FLOAT	YES	YES		YES		
		RINSE	YES	YES	YES	YES	YES	
	FLOATLESS DUMPER WITH ONLY CHLORINE OR NO FUNGICIDES	FLOAT	YES	YES	YES	YES	YES	YES
		RINSE	YES	YES	YES	YES	YES	YES
NCCW	NO PRIORITY POLLUTANTS, DANGEROUS WASTES, OR TOXICS IN TOXIC AMOUNTS		YES	YES	YES [5]	YES	YES	YES
	WITH PRIORITY POLLUTANTS, DANGEROUS WASTES, OR TOXICS IN TOXIC AMOUNTS		YES					

1. Wastewater containing soap and/or wax must receive at least secondary treatment prior to discharge to surface water.
2. Wastewater containing lignosulfonate cannot be discharged to POTWs with UV disinfection
3. pH adjustment may be needed before discharge
4. Pretreatment may be needed to meet sulfate limits
5. Discharge of NCCW to a POTW is allowed only under extraordinary circumstances and requires, in addition to coverage under this permit, the written approval of both the Department and the POTW

TREATMENT/DISPOSAL METHOD SPECIFICATIONS

The following specifications apply to all TDMS.

Sample Type And Frequency

All samples shall be representative composites with the exception of measurements for pH, total residual chlorine, and temperature, which shall be done on grab samples immediately after collection.

Monitoring will be done in any quarter in which there is a discharge.

Monitoring frequency will be quarterly for all parameters except 1) TBZ and Ethoxyquin concentrations in drencher water which shall be done annually, and 2) all non-NCCW discharge parameters to surface waters, which shall be done monthly.

The Department may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

Inspection Of TDMs

The permittee will make regular inspections of all TDMs at a frequency to ensure their proper operation. For dust abatement, land application, and percolation systems this inspection shall take place at the time of discharge. Any abnormalities shall be recorded along with a description of any actions taken to correct the problem. Examples of such abnormalities include, but are not limited to: high liquid levels, rapid changes in lagoon liquid levels, holes or deterioration in a liner, washouts, berm damage, overflows, abnormal odors or colors, foaming, ponding, runoff, overland flow, abnormal crop growth, soil or water quality deterioration, sediment build-up, changes in biota, etc. Discovery of any significant abnormality shall be cause for taking immediate corrective actions and shall also be reported to the Department within 48 hours of discovery, along with a description of the corrective action taken or planned.

Minimum Setbacks

Table 3. Minimum Setbacks

	Minimum Setback Distance (Feet) to:	
	Surface waters of the State, Irrigation supply ditches, Drainage ditches, Wetlands	Potable water supply well
IMPOUNDMENT TYPE		
Lined lagoons with DPA	250	250
Lined lagoons without DPA	50	100
Unlined lagoons	50	100
APPLICATION SITE		
Dust abatement	50	100
Land application	50	100
Percolation systems	50	100

- The setbacks to potable water supply wells were determined using BPJ and, as guidance, WAC 173-160-205, which states that wells shall be located at least 100 feet from known or suspected contamination sources.

- No impoundments or wastewater applications are allowed within Wellhead Protection Areas. Contact the Department of Health for more information on the Wellhead Protection Program.

Impoundments

All impoundments, including lined evaporative lagoons, sedimentation ponds and storage lagoons shall meet the requirements specified in this permit for lined evaporative lagoons.

TDM 1. LINED EVAPORATIVE LAGOONS

A lined evaporative lagoon is defined as an imperviously lined, engineered structure which relies entirely upon evaporation for water removal. This may be an in-ground lined evaporative lagoon or a pre-manufactured, above-ground fiberglass or metal tank. For facilities desiring coverage under the Fresh Fruit General Permit, the Department will require all evaporation lagoons to be constructed with a geomembrane liner which meets or exceeds the performance specifications of a 30 mil HDPE geomembrane liner for lagoons constructed before July 1, 2004 or 40 mil HDPE for lagoons constructed after that date. The Department may require, in certain situations, the use of a geomembrane liner with higher specifications and/or double-layered liners. For the purposes of this permit, clay liners are not acceptable.

These devices rely on the evaporation of wastewater held in an imperviously lined structure. Liners are usually referred to as being composed of clay, amended soil, geomembrane, or any combination of these. The Department has determined that clay and amended soil liners are less desirable than geomembrane liners due to extreme dependency on liner compositional characteristics and construction methods; a slight mistake in any of which may allow substantial percolation. Geomembranes are composed of man-made materials such as: thermoplastics (i.e. polyvinyl chloride [PVC]); crystalline thermoplastics (i.e. high density polyethylene [HDPE]); elastomers (i.e. butyl rubber); and, thermoplastic elastomers (i.e. Hypalon). These liners are typically non-reactive to chemicals in wastewater; however, some types will lose plasticizer (degrade) when exposed to ultraviolet (UV) light. HDPE is very UV resistant, with PVC being significantly less resistant.

Best Management Practices for Lined Evaporative Lagoons

- Pollutant/parameters are limited by full compliance with the following required BMPs. No chemical testing shall be required for such discharges to lined evaporative lagoons.
- All impoundments shall be located, designed, and managed to control odors and insects.

- Do not co-mingle drencher discharges with any other process waste streams which contain chlorine.
- Maintain a minimum of two (2) feet of freeboard at all times.
- Make regular inspections of the lagoon at a frequency sufficient to monitor proper operation, but in no case less than weekly during periods of discharge to the lagoon. Maintain records of any abnormalities along with a description of any actions taken to correct the problem. Examples of

such abnormalities include, but are not limited to: high liquid levels, rapid changes in liquid levels, holes, washouts, liner deterioration, overflows, deterioration of berm walls, etc. Take immediate corrective actions and report to the Department within 48 hours of the discovery of any such significant abnormality.

- The lagoon shall be completely emptied and the liner subsequently examined for substantial deterioration at least every 5 years. If substantial deterioration is found, the liner shall be replaced or warrantably repaired. Results of the inspection shall be reported in the "Application for Renewal of Coverage".
- Permittee shall ensure that any sludge or solid wastes produced during any sedimentation process be treated and disposed of in accordance with the terms of the Solid Waste Management Plan in the Permittee's Environmental Compliance Plan. The treatment and disposal shall be in compliance with all State and County Health Department regulations;
- The Permittee shall provide that the design and construction of any impoundment be managed by a State licensed engineer, unless this requirement is waived by Ecology in accordance with Chapter 173-240 WAC;
- The Permittee shall obtain a dam safety permit if the above-ground storage capacity exceeds ten (10) acre-feet;
- The lagoon shall meet the following:

1. Be constructed of a geomembrane material which is specifically engineered to withstand internal and external pressure gradients, physical contact with wastes, climatic conditions, and stresses of installation and daily operation. The lagoon liner must be a geomembrane liner which meets or exceeds the performance specifications of a 30 mil HDPE geomembrane liner for lagoons constructed before July 1, 2004 or 40 mil HDPE for lagoons constructed after that date.
2. Have a continuous liner covering the entire inner bottom and sides of the structure that are likely to be in contact with wastewater;
3. Be placed on a base of sand or similar material thick enough to prevent failure due to settlement, compression, stretching, or uplift;
4. Prevent the movement of wastewater chemicals through its structure to waters of the State, or to contact any adjacent ground or soil;
5. Have a life expectancy which must extend at a minimum, through the entire time of this general permit;
6. Be surrounded by a minimum six (6) foot high fence with a locked gate;

Alternatives to geomembrane lined lagoon

The Permittee may alternatively use a warrantable pre-manufactured fiberglass, fiberglass-lined, or metal tank in lieu of the geomembrane lined evaporative lagoon. In this case, the permittee shall be required to comply fully with all the above-listed BMPs and prohibitions, except for items 1-3 listed above. Additionally, the tank shall be set above ground.

Rationale for lined evaporation lagoons

There shall normally be no requirement for analyzing any wastestream being discharged to a lined evaporation lagoon: discharge limits shall be the maximum normal use concentrations, and discharge volumes will be limited to not exceed the two-foot freeboard daily minimum monitoring limit. However, sampling shall be conducted on any lagoon discharge (all being prohibited) including, but

not limited to, over-topping or leakage. The Department anticipates that, if all the above BMPs are properly implemented, this TDM should adequately protect the ground waters of the State.

TDM 2. DUST ABATEMENT APPLICATION

Dust Abatement is the application of wastewater to unpaved bin storage lots and unpaved roads for the purpose of dust suppression. This TDM is intended primarily for the discharge of drencher wastewater and pear float tank wastewater containing lignosulfonate, sodium sulfate, or sodium silicate. Wastewaters containing sodium sulfate may require desulfonation prior to discharge to meet the total sulfate effluent limit. Wastewaters containing sodium silicate may require neutralization prior to or immediately after discharge to meet the pH effluent limit. Float tank and rinse water may also be discharged to the dust abatement TDM with certain application rate restrictions.

Dust abatement shall only be allowed on unpaved roadways or unpaved bin storage lots. A special **Road Management Plan** (RMP) shall be required for each facility desiring to use this alternative TDM for wastestreams containing either DPA, lignosulfonate, or chlorine-based chemicals. The permittee's RMP must not allow for potential or actual contamination of the waters of the State, or violate any other Federal, State, or local regulation.

Application Rates and Frequencies

- Discharges shall not exceed those specific numerical limits and application rates given in Tables 4, 5, 6, or 7;

Table 4. Application Rates, Frequencies, and Allowed Sites for Dust Abatement

<table>
<tr><th colspan="2" rowspan="2">WASTESTREAM DESCRIPTION</th><th colspan="2">MAXIMUM APPLICATION</th><th rowspan="2">ALLOWED SITES</th></tr>
<tr><th>RATE</th><th>FREQUENCY [1]</th></tr>
<tr><td colspan="2">Any permitted wastestream except drencher & pear float wastewater</td><td>1800 gallons/acre/day</td><td>180 times/year every day</td><td rowspan="11">only unpaved bin lots or unpaved roads</td></tr>
<tr><td rowspan="2">Any drencher wastewater</td><td>Not containing calcium chloride</td><td>1800 gallons/acre/day</td><td>30 applications/year every other day</td></tr>
<tr><td>Containing calcium chloride</td><td>1800 gallons/acre/yr</td><td>one (1) application/year</td></tr>
<tr><td rowspan="7">Pear float tank wastewater with SOPP or other fungicide concentrations in (mg/L)</td><td>0 to 1000</td><td>4840 gal/acre/day</td><td>once per week</td></tr>
<tr><td>1001 to 2000</td><td>2420 gal/acre/day</td><td>once per week</td></tr>
<tr><td>2001 to 3000</td><td>1613 gal/acre/day</td><td>once per week</td></tr>
<tr><td>3001 to 4000</td><td>1210 gal/acre/day</td><td>once per week</td></tr>
<tr><td>4001 to 5000</td><td>968 gal/acre/day</td><td>once per week</td></tr>
<tr><td>5001 to 6000</td><td>807 gal/acre/day</td><td>once per week</td></tr>
<tr><td>greater than 6000</td><td colspan="2">Discharge Not Allowed</td></tr>
</table>

1. Application rates are valid only if chemical additives concentrations are in compliance with the maximum label use rates specified in Table. 6.
2. Apply DPA-containing wastestreams at any rate up to a maximum annual rate of 990 lbs/acre of road surface, which is equivalent to the discharge of 1,800 gallons/acre of 2,200 mg/L of DPA, 30 times per year;
3. Apply DPA-containing wastestreams at any rate up to a maximum daily rate of 1,800 gallons/acre of road surface;
4. Apply DPA-containing wastestreams no more frequently than every other day;
5. Apply lignosulfonate-containing wastestreams at any rate up to a maximum daily rate of 1.3 tons of lignosulfonate solids/acre (4,840 gallons/acre of 12% lignosulfonate);
6. Apply lignosulfonate-containing wastestreams at any rate up to a maximum annual rate of 67.6 tons of lignosulfonate solids/acre (4,840 gallons/acre of 12% lignosulfonate, 52 times/year);

Table 5. Effluent Limits & Monitoring for All Wastewater Discharges to Dust Abatement

POLLUTANT / PARAMETER (UNITS)	DAILY MAXIMUM LIMIT			SAMPLE FREQUENCY	SAMPLE TYPE
	DRENCHER WATER ONLY [1]	NCCW ONLY	ALL OTHER WASTE-WATER		
Analysis is required for all of the following parameters except those marked NR (Not Required)					
Flow (gallons/day)	record value	record value	record value	1/discharge event	Measure-ment
pH (standard units)	NR	6.0 – 9.0	6.0 – 9.0	Quarterly	Grab
Total Chloride (mg/L)	NR	NR	250	Quarterly	Composite
TDS (mg/L)	NR	record value	NR	Quarterly	Composite
Analysis is required for all of the following parameters except: 1) those marked NR (Not Required), or 2) if that chemical is not used at the facility					
Total Residual Chlorine (mg/L) [2]	10.0	10.0	10.0	Quarterly	Grab
Total Sulfate (mg/L)	NR	NR	250	Quarterly	Composite
Captan® (mg/L)	10.0	NR	10.0	Quarterly	Composite
Dichloran® (mg/L)	10.0	NR	10.0	Quarterly	Composite
Ethoxyquin	2700	NR	NR	Annual	Composite
TBZ (mg/L)	615	NR	NR	Annual	Composite
SOPP (mg/L)	NR	NR	See Table 4	Quarterly	Composite

[1] Effluent limits and monitoring are valid only if all chemical additive concentrations and application rates are in compliance with those specified in Tables 4 and 6.

[2] Required test only if chlorine or any chlorine-based chemical is used (i.e. ,sodium hypochlorite, chlorine dioxide, chlorine gas)

Table 6. Chemical Additive Maximum Use Rates

CHEMICAL USE	CHEMICAL ADDITIVE	MAXIMUM USE RATE
Pear float enhancers	Lignosulfonate	120,000 mg/L or 12% solids
	Sodium sulfate	30,000 mg/L or 3% solids
	Sodium silicate	30,000 mg/L or 3% solids
Drencher additives	DPA	2200 mg/L
	TBZ	615 mg/L
	Ethoxyquin	2700 mg/L
	Calcium chloride	2200 mg/L

Table 7. Required Soil & Groundwater Monitoring for Discharges Containing Lignosulfonate

Application Frequency	Additional Required Monitoring	Testing Frequency
once every 30 or more days	None	N/A
once every 14 to 29 days	Test subsoil with dipyridyl for the presence of Fe^{+2} ions at 12-inch depth within the lowest part of the application site where ponding may occur.	Quarterly
once every 7 to 13 days	Install a down gradient monitoring well to test groundwater for BOD_5 and, with Dipyridyl, for the presence of Fe^{+2} ions.	Monthly

- Maximum use rate of lignosulfonate is 12% solids or 120,000 mg/L
- Maximum application rate is 4840 gal/acre
- Maximum application frequency is no more than once every 7 days

Best Management Practices for Dust Abatement

- Do not commingle or apply to the same site any wastestream containing:
  - DPA;
  - Lignosulfonate;
  - Chlorine or chlorine-containing compounds;
- Utilize an application system which provides even distribution of the wastewater over the application area at the specified application rates and frequencies.
- Maintain accurate and ongoing records to verify that chemical additives are being used at or below the use rate concentrations specified in Table 6 and to ensure that the application of wastewater to each site is in compliance with the required application rates, BMPs, and other permit conditions. The following information shall be kept for all original and make-up batches:
  - Batch ID Number;
  - Date batch was mixed;
  - Person responsible for mix;
  - Total batch volume (gallons);
  - Name and amount of all chemicals added to batch;

- Date spent solution was discharged;
- Application Site Identification (used to track application to prevent over application or improper mixing of wastewater)
- Volume of spent solution discharged (gallons)
- Actual application area (acres)
- Application rate (gallons/acre)
- Inspection results and comments regarding any abnormal conditions such as ponding, runoff, overland flow, etc. (see Section 5. "Inspection of TDMs").

- Do not commingle process wastestreams with sanitary (domestic) sewage;
- Do not discharge in excess of the specific numerical limits and application rates given in Tables 4, 5, 6 and 7;
- Do not discharge priority pollutants, dangerous wastes, or toxics in toxic amounts;
- Make No allowance for background levels of contaminants already in the supply water;
- Do not apply at a rate which results in ponding or runoff;
- Do not apply to sites where the groundwater table is located within five (5) feet of the soil surface at time of application;
- Do not apply to sites which are frozen, snow-covered, saturated, flooded, or when anaerobic conditions exist;
- Provide sufficient self-contained storage capacity for all wastewaters during any time period when application cannot be properly achieved (i.e., when application site is saturated, flooded, or frozen). This self-contained storage shall meet the requirements in the Lined Evaporative Lagoon TDM;
- Treat and dispose of any sludges or solid wastes produced during any sedimentation process in accordance with the terms of the Solid Waste Management Plan in the Permittee's Environmental Compliance Plan and in compliance with all State and County Health Department regulations;
- Do not apply to sites within wellhead protection boundaries.

Road Management Plan (RMP)

Prior to any discharge and for each separate dust abatement application site, an RMP shall be developed and retained on-site. The following wastestreams must have separate application sites and RMPs: 1. Wastewater containing lignosulfonate; 2. Wastewater containing DPA; or 3. Wastewater with chlorine or chlorine-containing compounds. Each RMP shall, at a minimum, include:

1. A copy of proof of ownership of the application site, or a legally binding written agreement with the legal owner to use the site for wastewater treatment and disposal;

2. An application site description including, at a minimum:
   - The location of the application site;
   - A map indicating the site boundaries;
   - A brief description of the geology and topography of the site and its immediately surrounding areas indicating its suitability as an application site;
   - The surface material and composition of the site, i.e. dirt road or gravel bin lot; and
   - The total surface area of the application site.

3. An operational plan including, at a minimum:
   - The proposed total maximum daily and annual application rates expressed as gallons/acre/day and gallons/acre/year;
   - The maximum use concentration of the active ingredient(s) (DPA; Ethoxyquin, calcium chloride, lignosulfonate, etc.) in the wastewaters to be applied; and
   - The proposed application schedule and operational methodology to be followed throughout the duration of this general permit.

Rationale for dust abatement effluent limits and application rate limits

1. **BOD_5:** No monitoring for BOD will be required for wastewater discharges to dust application. These discharges, other that those containing lignosulfonate, typically have BOD_5 concentrations less than 500 mg/L. Combined with the maximum daily application rate of 1800 gallons/acre, this results in BOD_5 loadings of less than 7.5 lbs/acre/day, which BPJ suggests is protective of groundwater.

   BPJ suggests that BOD_5 from pear float solutions containing lignosulfonate is best controlled using proper solution preparation, application rates, and BMPs. Lignosulfonate solutions shall not exceed the normal use rate of 12% (120,000 mg/L), of which 50% or 60,000 mg/L are solids. With a BOD_5 to solids ratio of 0.3 to 1, this results in a maximum BOD limit of 18,000 mg/L.

   BPJ suggests that the following two application rates not be exceeded: a maximum annual rate of 67.6 tons of lignosulfonate solids/acre, and a maximum daily rate of 1.3 tons of lignosulfonate solids/acre. This limit is anticipated to protect the ground water of the State based on the following manufacturers' recommendations: (1) suggested maximum application rate of 50 tons of lignosulfonate solids/acre; and (2) dust abatement application rate 1.3 tons of lignosulfonate solids/acre. This dust abatement daily application rate of 1.3 tons solids/acre, when using the normal use concentration of 6% solids (60,000 mg/L), calculates to approximately 1.0 gallons/square yard or 4,840 gallons/acre. This is in line with the manufactures' recommendation for dust abatement application of 0.25 gallon per square yard of a 25% solids solution.

   BPJ suggests the application frequency intervals be long enough to allow time for biological degradation to occur. Application intervals were chosen (see Table 4, Pear Float Tank) that would result in application rates approximating the one time application of 60 tons of solids per acre that was reported to pose no threat of groundwater contamination (ITT Rayonier Inc., "Environmental Effects of Applying Lignosulfonate to Roads", Rayonier Chemical Products Update, May 1989).
   Additional required soil and groundwater monitoring for the higher frequencies are specified in Table 8.

Table 8. Application Frequencies And Monitoring For Wastewater Containing Lignosulfonate

IF THE ANNUAL APPLICATION RATE IS (TONS OF SOLIDS/ACRE)	WHICH IS A RATE EQUIVALENT TO	YOU MUST DO THIS ADDITIONAL REQUIRED MONITORING	AT THIS MONITORING FREQUENCY
0 TO 15.6	Applying 4840 gal/acre of 12% lignosulfonate wastewater once every 30 days	None	N/A
> 15.6 to 33.8	Applying 4840 gal/acre of 12% lignosulfonate wastewater once every 14 days	Test subsoil with dipyridyl at 12-inch depth within the lowest part of the application site where ponding may occur for the presence of Fe^{+2} ions.	Quarterly
> 33.8 to 67.6	Applying 4840 gal/acre of 12% lignosulfonate wastewater once every 7 days	Install a down gradient monitoring well to test groundwater for BOD_5 and with dipyridyl for the presence of Fe^{+2} ions.	Monthly

The Permittee shall determine at which of the preceding three annual application rates any lignosulfonate wastewater will be applied to the dust abatement site at the facility. The Permittee shall record the application rate and results of all required soil and groundwater monitoring.

The Department shall approve any groundwater monitoring site prior to any installation of a groundwater monitoring well.

No other TDM shall be allowed for float or flume wastestreams containing lignosulfonate under the general permit due to the extremely high BOD and TSS content of these wastewaters. Both maximum limits shall remain in force for the life of the general permit unless scientific evidence becomes available indicating that a different limit may be allowed. The general permit may then be modified accordingly.

2. **CAPTAN® or DICHLORAN®:** BPJ suggests that both Captan® and Dichloran® should be controlled by in-house procedures. Their discharge limits will be equal to the dangerous waste regulations calculated maximum concentration of 10.0 mg/L.

3. **DPA-containing wastestreams:** BPJ suggests that DPA should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal use concentration of 2,200 mg/L. BPJ suggests a maximum daily application rate of 1,800 gallons/acre, no more frequent than every other day, with a maximum of 30 applications per year to a single site. This is equivalent to an annual application rate of 990 lbs of DPA/acre. The maximum annual

and daily rates were derived using data collected by Gray & Osborne, Inc. during a soil column study in late 1993. These maximum rates and frequencies shall remain in force for the life of the general permit unless scientific evidence becomes available indicating that a different limit may be allowed. The general permit may then be modified accordingly.

The permit will not require an analysis of this parameter, for this TDM, if the Permittee complies with all the terms and conditions of the general permit and applies this wastewater at a rate of not more than 1,800 gallons/acre/day, and no more frequently than every other day, 30 times per year. The permittee shall maintain records of all drencher water discharges using either the "Batch Mix Record" form or an equivalent. See the discussion on DPA (page 26) for further details.

4. **Ethoxyquin®:** BPJ suggests that Ethoxyquin® should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal use concentration of 2,700 mg/L, no more frequent than every other day, with a maximum of 30 applications per year to a single site. The only required analysis for ethoxyquin-containing drencher wastewater will be an annual verification of the chemical additive concentrations, if the Permittee complies with all the terms and conditions of the general permit. The Permittee shall record, for each batch, the same information as required for drencher wastewater containing DPA.

5. **pH:** BPJ suggests that this parameter should be controlled by in-house procedures. Discharge pH shall be maintained in the range of 6.0 to 9.0.

6. **Sodium silicate:** BPJ suggests that sodium silicate should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal use concentration of 30,000 mg/L. Analysis of this parameter will not be required for this TDM, if the Permittee complies with all the terms and conditions of the general permit. BPJ suggests that any application rate (not concentration) which does not produce runoff or ponding will be permitted. However, these wastestreams will need to be neutralized to an acceptable pH range (6 to 9) prior to or immediately after application.

7. **SOPP:** BPJ suggests that SOPP should be controlled by in-house procedures. The discharge limit will be equal to the dangerous waste regulations calculated maximum concentration of 1,000 mg/L. The formula for calculating application rates for SOPP concentrations greater than 1000 mg/l is:

$$\text{Rate}_{\text{SOPP}>1000} = \frac{\text{Rate}_{\text{SOPP}<1000} \times \text{SOPP Effluent Limit (mg/l)}}{\text{Actual SOPP concentration}}$$

$$= \frac{4840 \text{ gal/ac} \times 1000 \text{ mg/l}}{\text{Actual SOPP concentration}}$$

8. **TBZ:** BPJ suggests that TBZ should be controlled by in-house procedures. The discharge limit will be the maximum normal drencher use concentration of 615 mg/L, no more frequent than every other day, with a maximum of 30 applications per year to a single site. The only required analysis for ethoxyquin-containing drencher wastewater will be an annual verification of the chemical additive concentrations, if the Permittee complies with all the terms and

conditions of the general permit. The Permittee shall record, for each batch, the same information as required for drencher wastewater containing DPA.

9. **Total chloride:** BPJ suggests that total chloride should be controlled by in-house procedures. The discharge limit will be 250.0 mg/L, the State's ground water quality standard, for wastewater which does not contain calcium chloride. For wastewater discharges containing calcium chloride, analysis of this parameter will not be required for this TDM, if the Permittee complies with all the terms and conditions of the general permit. This includes the use of calcium chloride at concentrations no greater than the label rate of 2200 mg/L and a maximum **annual** application rate of 1800 gallons per acre. See the discussion of calcium chloride in the "Chemicals Used" section of this fact sheet for more details on the derivation of these use and application limits.

10. **Total residual chlorine (TRC):** BPJ suggests that TRC should be controlled by in-house procedures. The discharge limit will be equal to the dangerous waste regulations calculated maximum concentration of 10.0 mg/L.

TDM 3. POTW (PUBLICLY OWNED TREATMENT WORKS)

A POTW is a municipal or regional wastewater treatment plant.

Wastewater discharged to a POTW will be subject to special BMPs and prohibitions anticipated to be protective of all POTWs. These treatment systems operate on a biological-based design, and therefore any slug load of pollutants has the potential to disrupt these operations. Since there have been past instances of POTW upsets directly attributable to the fresh fruit packing industry, these specialized BMPs and prohibitions are required.

The effluent limits, monitoring, and best management practices contained in this permit may be modified by any stricter conditions imposed by a POTW. Compliance with the terms of this permit does not relieve the permittee from the responsibility to comply with any contract or agreement with the POTW or for responsibility for any contamination, pass-through, or upset of a POTW related to the discharge of any facility wastewater.

In addition to other BMPs, dischargers to a POTW TDM must:

1. Obtain written certification from the receiving POTW accepting the facility's wastewater. The certification form is contained in the Application for Coverage;
2. Comply fully with all applicable pretreatment standards including, but not limited to, the following:
   a. General Pretreatment Regulations 40 CFR Part 403;
   b. Any stricter local municipal sewer use ordinance; and
   c. Any stricter local health district regulations;
3. Not discharge in excess of those specific numerical limits given in Table 9 of the permit;
4. Not discharge priority pollutants, dangerous wastes, toxics in toxic amounts, or any other wastewater which is prohibited, toxic, or otherwise detrimental to sewage treatment facilities or processes.

Rationale for POTW discharge pollutant limitations

1. **BOD_5:** BPJ suggests that the discharge limit should be 500.0 mg/L. This represents a limit approximately twice as great as typical average domestic sewage (250.0 mg/L BOD_5). Domestic sewage BOD_5 concentrations have reached 500 mg/L with no substantial disruption of POTW activities. This limit should adequately protect POTWs from slug load disruption.

2. **Ethoxyquin®:** BPJ suggests that Ethoxyquin® should be controlled by in-house procedures. The discharge limit will be equal to 50.0 mg/L which takes into consideration the toxicity of Ethoxyquin®.

3. **pH:** BPJ suggests that this parameter should be maintained in the range of 6.0 to 9.0.

4. **SOPP:** BPJ suggests that SOPP should be controlled by in-house procedures. The discharge limit will be equal to 50.0 mg/L which takes into specific consideration the toxicity of SOPP.

5. **TBZ:** BPJ suggests that TBZ should be controlled by in-house procedures. The discharge limit will be equal to 50 mg/L which takes into specific consideration the toxicity of TBZ.

6. **Total chloride:** BPJ suggests that total chloride should be controlled by in-house procedures. The discharge limit will be 250.0 mg/L which takes into specific consideration the protection of the waters of the State.

7. **Total residual chlorine (TRC):** BPJ suggests that TRC should be controlled by in-house procedures. The discharge limit will be 0.50 mg/L which takes into specific consideration the toxicity of chlorine.

8. **Total sulfate:** BPJ suggests that total sulfate should be controlled by in-house procedures. The discharge limit will be 250.0 mg/L (the State's ground water quality standard) which takes into specific consideration the protection of the waters of the State and that no substantial treatment would occur in the POTW.

9. **TSS:** BPJ suggests that the discharge limit should be 500.0 mg/L. This represents a limit approximately twice as great as typical average domestic sewage (250.0 mg/L TSS). Domestic sewage TSS concentrations have reached this quantity with no substantial disruption of POTW activities. This limit should adequately protect POTWs from slug load disruption.

TDM 4. LAND APPLICATION

Land application uses an engineered system for applying wastewater to a vegetated land surface. The applied wastewater is treated by the chemical, biological, and physical processes as it flows through the plant-soil matrix. The system consists of the land application site, a distribution system such as sprinklers for evenly distributing the wastewater, and a lined lagoon (or other Department approved, self-contained storage system) for storing wastewater during periods when it cannot be land applied. It is analogous to the slow rate land treatment process as described in the EPA Process Design Manual

and Supplement for the Land Treatment of Municipal Wastewater (EPA 625/1-81-013 and –013a). This design manual or other relevant Department approved documents (i.e. Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Department of Ecology Publication #93-36) shall be used as guidance for designing land application systems.

Sprinkler (sprayfield) systems are generally the most appropriate land application systems for wastewaters from the fruit packing industry. Other methods may be used if they provide adequate distribution of the wastewater. A successful land application project will achieve a level of wastewater treatment that will not result in violations of groundwater or surface water quality standards. The Department has determined that land application satisfies as AKART only after satisfactorily complying with, at least, all of the BMPs and prohibitions listed below.

- Do not commingle or apply to the same site any wastestream containing the following:
    - DPA;
    - Lignosulfonate;
    - Chlorine or chlorine-containing compounds;
- Utilize an application system which provides even distribution of the wastewater over the application area at the specified application rates and frequencies.
- Apply DPA-containing wastestreams only to unirrigated non-crop lands and at any rate up to a maximum annual rate of 990 lbs/acre (the discharge of 1,800 gallons/acre of 2,200 mg/l of DPA, 30 times per year). The use of unirrigated non-crop lands is to prevent the DPA from being washed down into the ground before it has been degraded by the UV light from the sun;
- Apply DPA-containing wastestreams only to unirrigated non-crop lands and at any rate up to a maximum daily rate of 1,800 gallons/acre;
- For batch applications, maintain accurate and ongoing records to verify that chemical additives are being used at or below the use rate concentrations specified in Table 12 of the permit and to ensure that the application of wastewater to each site is in compliance with the required application rates, BMPs, and other permit conditions. The following information shall be kept for all original and make-up batches:
    - Batch ID Number;
    - Date batch was mixed;
    - Person responsible for mix;
    - Total batch volume (gallons);
    - Name and amount of all chemicals added to batch;
    - Date spent solution was discharged;
    - Disposal Site Identification (used to track application to prevent over application or improper mixing of wastewater)
    - Volume of spent solution discharged (gallons)
    - Disposal area (acres)
    - Application rate (gallons/acre)
    - Inspection results and comments regarding any abnormal conditions such as ponding, runoff, overland flow, etc. (see Section 5. Inspections).
- Do not commingle process wastestreams with sanitary (domestic) sewage;
- Do not discharge priority pollutants, dangerous wastes, or toxics in toxic amounts;
- No allowance for background levels of contaminants already in the supply water;
- Do not apply at a rate which results in ponding or runoff;

- Do not apply wastewater at rates with will exceed the published agronomic rates for the crop being applied to.
- If needed, properly install, operate and maintain a lined sedimentation pond or other Department approved treatment, designed to pretreat the wastewater to prevent violation of the TSS effluent limit and prevent plugging of the wastewater distribution system;
- Do not apply to sites where the groundwater table is located within ten (10) feet of the soil surface at time of application;
- Do not apply to sites which are frozen, snow-covered, saturated, flooded, or when anaerobic conditions exist;
- Provide sufficient self-contained storage capacity for all wastewaters during any time period when application cannot be properly achieved (i.e., when application site is saturated, flooded, or frozen). This self-contained storage shall meet the requirements in the Lined Evaporative Lagoon TDM;
- Treat and dispose of any sludges or solid wastes produced during any sedimentation process in accordance with the terms of the Solid Waste Management Plan in the Permittee's Environmental Compliance Plan and in compliance with all State and County Health Department regulations;
- Do not apply to sites within wellhead protection boundaries.
- Maintain onsite a copy of some proof of ownership of the application site, or otherwise, a written agreement with the legal owner to use the site throughout the duration of this permit for wastewater treatment/disposal;
- Prohibit livestock from grazing on the application site.
- Do not discharge in excess of those specific numerical limits and application rates given in Tables 9, 10 and 11;

Application Rates, Frequencies, and Allowed Sites

Table 9. Application Rates, Frequencies, and Allowed Sites [1]

WASTESTREAM DESCRIPTION		MAXIMUM APPLICATION RATE	MAXIMUM APPLICATION FREQUENCY	ALLOWED SITES
Any **drencher** wastewater	Not containing calcium chloride	1800 gal/acre/day	30 applications per year	Un-irrigated non-crop land
	Containing calcium chloride	1800 gal/acre/year	1 application per year	
Pear float tank water (excluding that with lignosulfonate)[2] with an SOPP (or other fungicide) concentration, in mg/L, of:	0 to 1000	4840 gal/ac/day	once per week	Un-irrigated non-crop land
	1001 to 2000	2420 gal/ac/day	once per week	
	2001 to 3000	1613 gal/ac/day	once per week	
	3001 to 4000	1210 gal/ac/day	once per week	
	4001 to 5000	968 gal/ac/day	once per week	
	5001 to 6000	807 gal/ac/day	once per week	
	greater than 6000	Discharge Not Allowed		
Any other permitted wastestream with BOD_5 or TSS levels, in mg/L, of:	0 to 200	6000 gal/acre/day	every other day	any suitable land application site
	201 to 400	3000 gal/acre/day	every other day	
	401 to 600	2000 gal/acre/day	every other day	
	greater than 600	Discharge Not Allowed		

[1] Application rates are valid only if chemical additives concentrations are in compliance with the maximum use rates specified in Table 11. Discharge of wastewater containing concentrations greater than those specified in Table 11. is not allowed.

[2] The only float tank water specific gravity enhancers allowed in wastewater discharged to land application are sodium sulfate and sodium silicate.

Table 10. Effluent Limits & Monitoring for All Discharges to Land Application

POLLUTANT / PARAMETER (units)	DAILY MAXIMUM LIMIT			SAMPLE FREQUENCY	SAMPLE TYPE
	DRENCHER WATER ONLY [1]	NCCW ONLY	ALL OTHER WASTE-WATER		
Analysis is required for all the following parameters except those marked NR					
Flow (gallons / day)	record value	record value	record value	1/discharge event	Measure-ment
BOD_5 (mg/L)	NR	NR	see table 9	Quarterly	Composite
pH (standard units)	NR	6.0 – 9.0	6.0 – 9.0	Quarterly	Grab
Total chloride (mg/L)	NR	NR	250	Quarterly	Composite
Total sulfate (mg/L)	NR	NR	250	Quarterly	Composite
TDS (mg/L)	NR	record value	500	Quarterly	Composite
TSS (mg/L)	NR	NR	see table 9	Quarterly	Composite
Analysis is required for the following PARAMETERS except: 1) those marked NR, or 2) if that chemical is not used at the facility					
Total Residual Chlorine (mg/L) [2]	10.0	10.0	10.0	Quarterly	Grab
Captan® (mg/L)	10.0	NR	10.0	Quarterly	Composite
Dichloran® (mg/L)	10.0	NR	10.0	Quarterly	Composite
Ethoxyquin (mg/L)	2700	NR	NR	Annual	Composite
TBZ (mg/L)	615	NR	500	Annual	Composite
SOPP (mg/L)	NR	NR	see table 9	Quarterly	Composite

[1] Effluent limits and monitoring valid only if all chemical additive concentrations and application rates are in compliance with those specified in Tables 9 and 11.

[2] Required test only if chlorine or any chlorine-based chemical is used (i.e., sodium hypochlorite, chlorine dioxide, chlorine gas)

Table 11. Chemical Additive Maximum Use Rates

CHEMICAL USE	CHEMICAL ADDITIVE	MAXIMUM USE RATE
Pear float enhancers	Sodium sulfate	30,000 mg/L or 3% solids
	Sodium silicate	30,000 mg/L or 3% solids
Drencher additives	DPA	2200 mg/L
	TBZ	615 mg/L
	Ethoxyquin	2700 mg/L
	Calcium chloride	2200 mg/L

Rationale for land application effluent limits and application rate limitations

1. **Permitted wastestreams, excluding DPA-containing wastestreams:** BPJ suggests that daily and annual discharge volume shall not exceed the published agronomic flow rate for that crop species or orchard land being applied to.

2. **DPA-containing wastestreams:** DPA-containing wastestreams shall only be applied to non-irrigated non-crop lands as suggested by the Washington State Department of Agriculture (WDOA). BPJ suggests that DPA should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal use concentration of 2,200 mg/L. BPJ suggests a maximum daily application rate of 1,800 gallons/acre, no more frequent than every other day, with a maximum of 30 applications per year to a single site. This is equivalent to an annual application rate of 990 lbs of DPA/acre. The maximum annual and daily rates were derived using data collected by Gray & Osborne, Inc. during a soil column study in late 1993. These maximum rates and frequencies shall remain in force for the life of the general permit unless scientific evidence becomes available indicating that a different limit may be allowed. The general permit may then be modified accordingly.

   The Department will not require an analysis of this parameter for this TDM, if the Permittee complies with all the terms and conditions of the general permit and applies this wastewater at a rate of not more than 1,800 gallons/acre/day, and no more frequently than every other day, 30 times per year. The permittee shall maintain records of all drencher water discharges using either the "Batch Mix Record" form or an equivalent. See the discussion on DPA for further details.

3. **BOD_5:** BPJ suggests that for wastewater discharges to land application, BOD_5 can be adequately controlled through the use of a tiered maximum daily application rate schedule which is based upon the actual BOD_5 concentration in the wastewater. Based upon experience with fruit juice processor wastewater discharges to sprayfields, BPJ suggests 10 lbs/acre/day of **soluble** BOD_5 is a reasonable maximum loading rate. Using this loading rate and the following formula a tiered application rate schedule can be calculated.

   Concentration (C) = Volume (V) x Mass (M) or solving for V

   $$V = M / C$$

   Where : V = Maximum Daily Application Rate in gallons/acre/day
   M = Target BOD_5 loading rate of 10 lbs/acre/day

C = Actual BOD_5 concentration in the wastewater in mg/L

Example: For wastewater with a BOD_5 of 200 mg/L

$$\text{Maximum Daily Application Rate} = \frac{(10 \text{ lbs/ac/day}) \times (453.6 \text{ gr/lb}) \times (1000 \text{ mg/gr}) \times (0.264 \text{ gal/L})}{(200 \text{ mg/L})}$$

$$= 5987.5 \text{ gallons/acre/day}$$
$$\cong 6000 \text{ gal/ac/day}$$

Assuming 200 days of application per year, the maximum annual application rate will be 1,200,000 gallons/acre/year, which is equivalent to 44.2 inches/year. This is within the range of published agronomic irrigation rates for orchards and pasture.

3. **CAPTAN® or DICHLORAN®:** BPJ suggests that both CAPTAN® and DICHLORAN® should be controlled by in-house procedures. The discharge limit will be equal to the dangerous waste regulations calculated maximum concentration of 10.0 mg/L.

4. **Ethoxyquin®:** BPJ suggests that Ethoxyquin® should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal use concentration of 2700 mg/L, no more frequent than every other day, with a maximum of 30 applications per year to a single site. The only required analysis for ethoxyquin-containing drencher wastewater will be an annual verification of the chemical additive concentrations, if the Permittee complies with all the terms and conditions of the general permit. The Permittee shall record, for each batch, the same information as required for drencher wastewater containing DPA.

5. **pH:** BPJ suggests that this parameter should be controlled by in-house procedures. Discharge pH shall be maintained in the typical range of 6.0 to 9.0.

6. **Sodium silicate:** BPJ suggests that sodium silicate should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal use concentration of 30,000 mg/L. Analysis of this parameter will not be required for this TDM, if the Permittee complies with all the terms and conditions of the general permit.

7 **SOPP:** BPJ suggests that SOPP should be controlled by in-house procedures. The discharge limit will be equal to the dangerous waste regulations calculated maximum concentration of 1,000 mg/L. The formula for calculating application rates for SOPP concentrations greater than 1000 mg/l is:

$$\text{Rate}_{\text{SOPP}>1000} = \frac{\text{Rate}_{\text{SOPP}<1000} \times \text{SOPP Effluent Limit (mg/l)}}{\text{Actual SOPP concentration}}$$

$$= \frac{4840 \text{ gal/ac} \times 1000 \text{ mg/l}}{\text{Actual SOPP concentration}}$$

8. **TBZ:** BPJ suggests that TBZ should be controlled by in-house procedures. The discharge limit will be equal to the maximum normal drencher use concentration of 615 mg/L, no more

frequent than every other day, with a maximum of 30 applications per year to a single site. The only required analysis for TBZ-containing drencher wastewater will be an annual verification of the chemical additive concentrations, if the Permittee complies with all the terms and conditions of the general permit. The Permittee shall record, for each batch, the same information as required for drencher wastewater containing DPA.

9. **Total chloride:** BPJ suggests that total chloride should be controlled by in-house procedures. The discharge limit will be 250.0 mg/L, the State's ground water quality standard, for wastewater which does not contain calcium chloride. For wastewater discharges containing calcium chloride, analysis of this parameter will not be required for this TDM, if the Permittee complies with all the terms and conditions of the general permit. This includes the use of calcium chloride at concentrations no greater than the label rate of 2200 mg/L and at maximum annual application rate of 1800 gallons per acre. See the discussion of calcium chloride in the "Chemicals Used" section of this fact sheet for more details on the derivation of these use and application limits.

10. **Total dissolved solids (TDS):** BPJ suggests that TDS can be measured directly and should be controlled by in-house procedures. The discharge limit will be 500.0 mg/L which takes into specific consideration the lack of degradation in soil and the protection of the waters of the State.

11. **Total residual chlorine (TRC):** BPJ suggests that TRC should be controlled by in-house procedures. The discharge limit will be equal to the dangerous waste regulations calculated maximum concentration of 10.0 mg/L.

12. **Total sulfate:** BPJ suggests that total sulfate should be controlled by in-house procedures. The discharge limit will be 250.0 mg/L which takes into specific consideration the probable lack of degradation in soil and the protection of the waters of the State.

13. **TSS:** BPJ suggests that the TSS discharge limit should be the same tiered application rates as discussed in the BOD_5 section.

TDM 5. PERCOLATION SYSTEMS

A Percolation System is an engineered system for aerobic treatment of wastewater as it percolates through the soil matrix. The system is designed to account for hydraulic and nutrient loading rates, wet and dry cycles, even wastewater distribution, and other relevant design parameters. It is analogous to the rapid infiltration land treatment process in the EPA Process Design Manual and Supplement for the Land Treatment of Municipal Wastewater (EPA 625/1-81- 013 and –013a). This design manual or other relevant Department approved documents shall be used as guidance for designing land application systems.

The TDM of discharging wastewaters to percolation lagoons or ditches will be strictly reviewed before being permitted. The Department is required by law to protect the State's ground waters, and so fruit packing wastewater discharges shall, at a minimum, comply with all of the State's ground water quality standards. The Department may require ground water monitoring and an individual permit at

percolation sites if the potential for contamination is suspected. This approach is substantiated by an investigation sponsored by one fresh fruit packer, which found that tests of leachate from the soil column tests yielded higher [concentrations of] mineral salts than found in [percolation] pond wastewater influent. Depending on dilution available, these constituents could impact the quality of underlying ground waters (Bain RC, Wastewater Disposal Report for Valley Fruit Inc., April 1989, 18 pg).

For this TDM, the Permittee shall:

- Utilize an application system which provides even distribution of the wastewater over the application area at the specified application rates and frequencies.
- Properly install, operate and maintain groundwater monitoring wells and apply for an individual permit if any groundwater contamination is detected or suspected by the Department;
- If needed, properly install, operate and maintain a lined sedimentation pond or other Department-approved treatment, designed to pretreat the wastewater to prevent violation of the TSS effluent limit and prevent plugging of the percolation system;
- The Permittee shall ensure that any sludges or solid wastes produced during any sedimentation process be treated and disposed of in accordance with the terms of the Solid Waste Management Method in the Permittee's Environmental Compliance Plan, and the treatment and disposal shall be in compliance with all State and County Health Department regulations;
- Not discharge priority pollutants, dangerous wastes, or toxics in toxic amounts;
- Not have any allowance for background levels of contaminants already in the supply water;
- Not apply to sites where the groundwater table is located within ten (10) feet from the soil surface;
- Not build impoundments or apply to sites less than fifty (50) feet from surface waters of the State, wetlands, or irrigation supply ditches;
- Not build impoundments or apply to sites less than one-hundred (100) feet from potable water wells;
- Not apply to sites within wellhead protection boundaries;
- Not discharge in excess of those specific numerical limits given in Table 12 ;

Table 13. Effluent Limits and Monitoring for All Discharges to Percolation Systems

POLLUTANT / PARAMETER	DAILY MAXIMUM LIMIT		SAMPLE FREQUENCY	SAMPLE TYPE
	ALL WASTEWATER EXCEPT NCCW	NCCW ONLY		
Analysis is required for all of the following parameters except those marked NR (Not Required)				
FLOW	record value	record value	1/discharge event	Measurement
BOD_5	100 mg/L	NR	Quarterly	Composite
pH	6.0 – 9.0	6.0 – 9.0	Quarterly	Grab
TOTAL CHLORIDE	250 mg/L	NR	Quarterly	Composite
TOTAL SULFATE	250 mg/L	NR	Quarterly	Composite
TOTAL DISSOLVED SOLIDS (TDS)	500 mg/L	record value	Quarterly	Composite
TOTAL SUSPENDED SOLIDS (TSS)	100 mg/L	NR	Quarterly	Composite
Analysis is required for all of the following parameters except: 1) those marked NR (Not Required), or 2) if that chemical is not used at the facility				
TOTAL RESIDUAL CHLORINE [1]	5.0 mg/L	5.0 mg/L	Quarterly	Grab
ETHOXYQUIN®	5.0 mg/L	NR	Quarterly	Composite
SOPP	6.0 mg/L	NR	Quarterly	Composite
THIABENDAZOLE (TBZ/MERTECT®)	10.0 mg/L	NR	Quarterly	Composite

[1] Required test only if chlorine or any chlorine-based chemical is used (i.e. sodium hypochlorite, chlorine dioxide, chlorine gas, etc.)

Rationale for percolation system pollutant limitations

1. **BOD_5:** BPJ suggests that the discharge limit will be 100.0 mg/L. This represents a 50% reduction (safety margin) of the most conservative limit as indicated in the Department's Guidelines for Land Application.

2. **Ethoxyquin®:** BPJ suggests that Ethoxyquin® should be controlled by in-house procedures. The discharge limit will be equal to 5.00 mg/L which takes into specific consideration both the toxicity of Ethoxyquin® and the protection of the waters of the State.

3. **pH:** BPJ suggests that this parameter shall be maintained in the range of 6.0 to 9.0.

4. **SOPP:** BPJ suggests that SOPP should be controlled by in-house procedures. The discharge limit will be equal to 6.00 mg/L which takes into special consideration both the toxicity of SOPP and the protection of the waters of the State.

5. **TBZ:** BPJ suggests that TBZ should be controlled by in-house procedures. The discharge limit will be equal to 10.00 mg/L which takes into specific consideration both the toxicity of TBZ and the protection of the waters of the State.

6. **Total chloride:** BPJ suggests that total chloride should be controlled by in-house procedures. The discharge limit will be equal to 250.0 mg/L which takes into specific consideration the protection of the waters of the State.

7. **Total dissolved solids (TDS):** BPJ suggests that TDS should be controlled by in-house procedures. The discharge limit will be 500.0 mg/L for non-NCCW discharges, which takes into specific consideration the protection of the waters of the State.

8. **Total residual chlorine (TRC):** BPJ suggests that TRC should be controlled by in-house procedures. The discharge limit will be equal to 5.00 mg/L which takes into specific consideration both the protection of the waters of the State and its degradation characteristics.

9. **Total sulfate:** BPJ suggests that total sulfate should be controlled by in-house procedures. The discharge limit will be equal to 250.0 mg/L which takes into special consideration the protection of the waters of the State.

10. **TSS:** BPJ suggests that the discharge limit should be 100.0 mg/L. This represents a 50% reduction (safety margin) of the most conservative limit as indicated in the Department's Guidelines for Land Application. This is intended to compensate for the higher probability of leaching and thus ground water contamination, than from land application.

TDM 6. SURFACE WATERS

Discharge to a surface water of the state which includes lakes, rivers, ponds, streams, inland waters, irrigation canals and return drains, saltwaters, wetlands, stormwater or other collection systems which discharge to a surface water, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

Setting Effluent Limits

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday,

December 22, 1992). The more stringent of these two limits must be chosen for each of the parameters of concern.

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state.

Fruit packing wastewater discharges shall, at a minimum, comply with all of the State Surface Water Quality Standards. There will be no allowance for background levels of contaminants already in either the receiving or supply water. Industry discharges to State surface waters must necessarily be absent of or extremely low in deleterious materials. If no numerical limit for any non-conventional pollutant can be found in chapter 173-201A WAC, then there shall not be allowed any detectable effluent concentration of that contaminant. The Department has determined that the major discharge contaminant problems facing the State's surface waters from the fresh fruit packing industry typically relate to BOD_5, temperature, pH, TSS, aesthetic values, and/or toxic and deleterious materials.

Mixing Zone

No mixing or dilution zone shall be authorized to the Permittee for any discharge to surface waters under this general permit.

Antidegradation Of Surface Waters

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body, except where that degradation has been shown to be necessary, AKART appropriate to the discharger is being used, and it is in the overriding public interest. Where such overriding public interest exists, the lowering must still not cause an excursion from the water quality criteria established for the waterbody or cause harm to the existing beneficial uses (e.g. fish, wildlife, aesthetics, recreation, etc.). In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. For the water quality parameters of temperature and dissolved oxygen the water quality standards generally allow a cumulative incremental change beyond that natural condition for human activities. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

General permits are issued under the same laws and regulations as individual permits, however, Ecology is unable to invest the time necessary to make the site-specific decisions regarding the water quality at the point of discharge for the large number of permittees wanting coverage under general

permits. Therefore, this general permit will contain language which says, "The permittee's discharge must not cause or contribute to an excursion of the State's water quality standards, including the State's narrative criteria for water quality [40 CFR 122.44(d)(1)(i)]. If the permittee discharges a pollutant at a location which is identified as causing a water quality standard's violation on the State's 303(d) list, that pollutant is not to be discharged at a concentration beyond the established water quality criteria for that waterbody (see Chapter 173-201A-030, 120, 130, and 140 WAC for applicable criteria)." Existing dischargers may be eligible for a compliance schedule that allows the discharger to be viewed as in compliance with the state standards while taking necessary actions that will allow the discharge to meet specific water quality criteria.

There is a reasonable expectation that all of the facilities currently under coverage of this general permit that have surface water discharges are satisfying the antidegradation requirements for surface waters of the state of Washington. The permit incorporates technology requirements that represent all known, available, and reasonable methods of prevention, control, and treatment to minimize the impact of the permittee's discharges on receiving waters. Ecology has additionally determined that allowing the lowering of water quality associated with this general permit is in the overriding public interest. This permit has been through two public review processes (1994 and 1999) with no significant opposing comments. The fresh fruit packing industry is a vital component on the state's multi-billion dollar agricultural industry and provides thousand of jobs, many of which are located in small communities.

The parameters of concern in wastewater discharges from the fresh fruit packing industry with regard to antidegradation are BOD, TSS, pH, Total Residual Chlorine (TRC), chlorides, temperature, and toxics. However, of approximately 57 facilities with discharges to surface waters, fifty-one of these discharge non-contact cooling water only.

This general permit was written with the assumption that compliance with all the terms and conditions would result in the reasonable expectation that the state's antidegradation requirements to protect existing uses and not violate water quality criteria would be met. The bases for these assumptions are included in the discussions of rationale for setting the effluent limits.

Discharges to surface waters will not be allowed under this general permit if either 1) the water body is designated as a Outstanding Water Resource (ORW) (Chapter 173-201A-080), or 2) the effluent exceeds a water quality criterion and the receiving water is on the most current 303(d) list for that criterion. No facilities with coverage under the general permit are discharging to an ORW. Any facility which discharges a pollutant which is on the 303-d list for that waterbody, must either select an alternative TDM or participate in the TMDL process for that waterbody and meet any Waste Load Allocation (WLA) assigned by the TMDL. If the facility is unable to meet the WLA under the general permit, the facility must apply for coverage under an individual NPDES permit.

Should later evidence indicate that the antidegradation requirements for surface waters are not being met, this permit may be modified to provide more stringent effluent limits, best management practices, or other permit conditions. As with any permit modification, the process will include an opportunity for industry and public review and input.

Allowed Discharges to Surface Water

The discharge of fruit packing wastewaters directly to surface waters of the State is only authorized for the following wastestreams:

1. Wastewater containing no chemical additives at all, or only chlorine-based disinfectants (i.e., chlorine gas, chlorine dioxide, sodium hypochlorite);
2. Secondary treated wastewater containing Linear Alkyl Sulfonate (LAS) based soaps, acidic or basic washes, food grade waxes, or chlorine-based disinfectants; or
3. NCCW system wastewater containing no priority pollutants, dangerous wastes, or toxics in toxic amounts.

Best Management Practices for Discharges to Surface Waters

1. Comply with all of the State water quality standards for surface waters, Chapter 173-201A WAC;
2. Properly install, operate and maintain a lined sedimentation device constructed to provide, at a minimum, one (1) full hour of detention time for sedimentation of process wastewaters except NCCW-only wastestreams, or another Department-approved measure;
3. Ensure that any sludges or solid wastes produced during any sedimentation process be treated and disposed of in accordance with the terms of the Solid Waste Management Method in the Permittee's Environmental Compliance Plan, and the treatment and disposal shall be in compliance with all State and County Health Department regulations;
4. Record and submit monthly all monitoring data, for any discharges containing process water, on an applicable Discharge Monitoring Report (DMR) form;
5. Monitor quarterly and submit on the applicable Yearly Facility Report all NCCW-only discharges;
6. Not discharge in excess of those specific numerical limits given in the general permit;
7. Not discharge priority pollutants, dangerous wastes, or toxics in toxic amounts; and
8. Not have any allowance for background levels of contaminants already in either the receiving or supply water.

Rationale for surface water pollutant limitations

BOD_5

BPJ suggests that the secondary treatment standards be used to limit this parameter to a maximum of 30.0 mg/L. This limit is typical for secondary treatment and should also protect beneficial use of surface waters.

To determine if this will satisfy antidegradation, an analysis of DO sag was done in the 1999 fact sheet using a biased scenario of a large process water discharge (200,000 gpd or 0.3 cfs) into a small stream at low flow conditions (3.0 cfs). A discharge with a BOD_5 at the maximum effluent limit concentration of 30 mg/L would be diluted to 3 mg/L. The Streeter-Phelps analysis showed the critical DO for this biased scenario was 8.06 mg/L, which exceeds the minimum criteria of 8.0 mg/l. BPJ reasonably suggests this will be sufficient to protect background DO levels. See the 1999 fact sheet for additional details on this analysis.

pH

BPJ suggests that this parameter shall be maintained in the range of 6 to 9, the water quality criteria level as specified for Class A waters in Chapter 173-201A WAC.

Soaps and Waxes

BPJ suggests that the level of wax and LAS-based soaps likely to be present in fruit packing wastewater will receive adequate treatment in systems providing secondary wastewater treatment and meeting the BOD limitation. LAS-based soaps are widely used and readily biodegradable. There are currently two packing facilities with similar secondary treatment systems which consist of aerated lagoons followed by rock filters. Six months of monitoring at one facility showed influent LAS levels of 1.7 to 4.5 mg/L. Effluent LAS levels were all <1 mg/L. The only monitoring required for these pollutants will be regular inspecting for foaming at the outfall.

Total chloride

BPJ suggests that total chloride be restricted to a maximum of 230.0 mg/L, which is the chronic, most restrictive, maximum limit specified for Class A waters in Chapter 173-201A WAC. BPJ suggests this limit will be protective of background water quality.

Total residual chlorine (TRC)

BPJ suggests that this parameter should be restricted to a maximum of 0.019 mg/L. This represents the acute, most restrictive, maximum limit for this parameter under the State's surface water quality standards specified for Class A waters in Chapter 173-201A WAC. Due to the lack of a reasonably priced field test kit which can detect total residual chlorine to this level, the established Quantitation Level of 0.05 mg/L (analytical detection limit), when using the required DPD/colorimeter test method, 40 CFR Part 136, shall serve as the enforceable limit for this parameter. A measured value between 0.019 and 0.05 mg/L may not be a violation due to the uncertainty of the test results at this concentration, and shall be reported as “less than 0.05 mg/L”. BPJ suggests this limit will be protective of background water quality.

TSS

BPJ suggests that the secondary treatment standards be used to limit this parameter to a maximum of 30.0 mg/L, which should be easily attainable. This limit is intended to protect human health and any other beneficial use of surface waters based on secondary treatment standards. Given the nature of TSS associated with fruit packing wastewater, which is generally fairly large particle size, BPJ suggests that typical fruit packing wastewater with a TSS of 30 mg/l would not exceed the water quality standard of no more than 5 NTU increase in turbidity over background.

Temperature

The previous permit required quarterly temperature monitoring of all surface water discharges. A temperature effluent limit was not specified due to the site specific nature of such a limit. The new

permit will continue quarterly temperature monitoring without specifying an effluent limit. BPJ suggests that current discharges will be protective of background water quality for temperature given the BMPs and the relative effluent to receiving water volumes. This is reasonable based upon an evaluation of the data collected in the previous permit cycle.

Sixty facilities reported 925 temperature data points for discharges to surface water. Of those 30% (18) of the facilities had all of their reported temperatures at or below the surface water criterion of 18° C. Sixty-five percent (603) of the total reported temperature readings were at or below 18° C. The 322 data points greater than 18° C were analyzed using a formula developed by Greg Pelletier of Ecology's Environmental Assessment Program. This formula estimates the temperature TMDL Waste Load Allocation for 303(d) listed water bodies. Also a 33° C maximum was established for the WLA.

WLA = WQC + (0.3 x DF)

WLA = Waste Load Allocation
WQC = Background Water at the Water Quality Criterion = 18° C
DF = Dilution Factor = (0.25 x (7Q10 flow + effluent volume)) / effluent volume

Of the 322 temperatures greater than 18.0° C that were evaluated using the WLA formula described above, 97% (313) were within the calculated WLA. Of the nine values that exceeded the calculated WLA, five were from one facility which discharges less than 1000 gallons per day to the Columbia River via a city storm sewer. The remaining four were either relatively small discharges or less than 1° C over the criterion.

In addition to the WLA analysis, a biased scenario was analyzed to determine theoretical increase in receiving water. The maximum discharge reported is 0.36 cfs. Using a biased case scenario with an effluent temperature of 33˚C (maximum WLA temperature), a receiving water temperature of 18˚C (surface water quality criterion), a receiving water flow of 20 cfs, and an effluent volume of 0.36 cfs, a theoretical increase in the receiving water temperature can be calculated using the formula.

REC. WATER TEMP INCREASE (°C) = (((EV x ET) + (RV x RT)) / (EV + RV)) - RT

= (((0.36 x 33) + (20 x 18)) / (0.4 + 20)) - 18

= 0.26 °C

Where EV = Effluent volume (cfs) RV = Receiving water volume (cfs)
ET = Effluent temperature (°C) RT = Receiving water temperature (°C)

The 0.26°C increase is less than the criterion of no increase greater than 0.3˚C due to man made causes.

Any facility which has a surface water discharge to a waterbody that is on the most recent approved 303(d) list for temperature shall participate in the TMDL process for that waterbody. If the implementation of the TMDL WLA cannot be completed under the general permit requirements, the facility must select an alternative TDM or apply for coverage under an individual NPDES permit.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters. The Department has determined that surface water discharges from the industry are unlikely to contain chemicals regulated for human health because the only allowed surface water discharges are wastewater containing no chemical additives at all, or only chlorine-based disinfectants (i.e., chlorine gas, chlorine dioxide, sodium hypochlorite), secondary treated wastewater containing only Linear Alkyl Sulfonate (LAS) based soaps, acid or basic washes, food grade waxes, or chlorine-based disinfectants, or NCCW wastewater containing no priority pollutants, dangerous wastes, or toxics in toxic amounts.

Narrative Criteria and WET Testing

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values by the presence of materials or their effects which offend the senses of sight, smell, touch, or taste, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh waters in the State of Washington.

The only discharges allowed by this permit to surface waters which have the potential to cause toxicity are NCCW containing chemical additives and wastewater containing chlorine-based fungicides. Residual chlorine is controlled through the total residual chlorine effluent limits and monitoring. The latest USEPA NPDES Permit Writers Manual (EPA-833-B-96-003) specifies that narrative toxicity criteria should be confirmed using Whole Effluent Toxicity (WET) testing. WET testing will be done on the surface water discharges of NCCW with chemical additives to verify they are not toxic.

Currently there are approximately 23 facilities with surface water discharges of NCCW containing chemical additives. WET testing completed by these facilities during the current permit cycle showed no significant acute toxicity in 100% effluent. Several facilities showed some chronic toxicity, however these were all relatively small discharges to large receiving waters such as the Columbia River resulting in dilution factors well over 1000. The WET testing established in the previous permit will continue as described below.

Each facility with a surface water discharge of NCCW containing chemical additives shall within one year of receiving coverage under this permit, submit to the Department results of rapid screening WET testing for both acute and chronic toxicity, as specified in Table 13. The rapid screening WET test shall also be completed within 3 months of any change in chemical additives.

Any facility which fails the rapid screening test and wishes to continue to discharge to surface water NCCW containing chemical additives shall select an alternate water treatment regime and repeat the WET test, or select an alternate Treatment / Disposal Method or apply for coverage under an individual NPDES permit.

If a facility with an individual permit meets the requirements of Chapter 173-205 WAC for attainment of the WET performance standard it may re-apply for coverage under the general permit.

Table 14. WET Testing Requirements

	ACUTE TOXICITY	CHRONIC TOXICITY
Test Method	ASTM E 1440-91, 24 hour	Snell, Terry W. 1992. A 2-d Life Cycle Test With The Rotifer *Brachionus calyciflorus*. Environmental Toxicology and Chemistry. 11:1249-1257.
Definition of "Pass"	A mortality rate of 20% or less in 100% effluent calculated by subtracting the number of test organisms living in 100% effluent at the end of the test from the number of test organisms living in the control, dividing the result by the number of test organisms living in the control and then multiplying by 100.	No chronic toxicity test demonstrating a statistically significant difference in response between the control and a test concentration equal to the acute critical effluent concentration (ACEC). Where no zone of acute criteria exceedance is allowed, as in the case with this general permit, the (ACEC) shall be one hundred percent (100%) effluent
Sample Type	Grab sample to be taken at a time when the chemical additive concentrations are at a maximum level in the discharge (i.e., immediately following a slug-load chemical addition).	
Test Species	Rotifer: *Brachionus calyciflorus*	
Test Frequency	Twice within first year of permit coverage and twice within 3 months of any change in chemical additives	

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S6. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-226-090).

LAB ACCREDITATION

With the exception of certain parameters, including pH, temperature and total residual chlorine, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

ENVIRONMENTAL COMPLIANCE PLAN

In accordance with state and federal regulations, each facility receiving coverage under this general permit shall develop and retain on-site, an environmental compliance plan with the following four sections:

1. Treatment / Disposal Method Operating Plan – In accordance with state and federal regulations, the permittee is required to take all reasonable steps to properly operate and maintain the treatment system (40 CFR 122.41(e) and WAC 173-226-080).
2. Solid Waste Management Plan - The Department has determined that the permittee has a potential to cause pollution of waters of the state from leachate of solid waste. This permit requires, under authority of RCW 90.48.080, that the permittee develop or update and implement a solid waste plan designed to prevent solid waste from causing pollution of the waters of the state.
3. Spill Prevention Plan – The Department has determined that the industry stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The department has the authority to require the permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080. This permit requires the permittee to develop or update and implement the plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.
4. Stormwater Pollution Prevention Plan - The Department has determined that the permittee has a potential to cause pollution of waters of the state from stormwater. This permit requires, under authority of CWA 402(p) and RCW 90.48.080, that the permittee develop or update and implement a stormwater pollution prevention plan designed to prevent stormwater from causing pollution of the waters of the state.

ECONOMIC IMPACT ANALYSIS

The department has determined that the changes made in this permit will not result in a significant change in the economic impact on the industry from the previous permit. No new economic impact analysis was done, beyond that covered in this section.

Summary of the Economic Impact of Permit Changes

Proposed Change	Expected Cost Impact	Costs Impact ($ / 5-year permit cycle)
Eliminate annual testing of DPA concentration	Reduce monitoring costs	500
Increase lagoon liner thickness specification from 30 mil to 40 mil.	Increase initial liner cost by $0.05 per ft^2	Neutral – initial increased liner cost will be offset by lower maintenance costs and longer liner life

PERMIT MODIFICATIONS

The Department may modify this permit to impose new or modified numerical limitations, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, or Department approved engineering reports. The Department may also modify this permit as a result of new or amended state or federal regulations.

WHEN FACILITIES MUST BE IN COMPLIANCE

Existing facilities, upon receiving coverage and lasting through the expiration date of the general permit, shall be in complete compliance with all terms and conditions. New facilities, prior to the commencement of discharge operations and lasting through the expiration date of the general permit, shall be in complete compliance with all terms and conditions.

WHEN COVERAGE IS EFFECTIVE

Unless the Department either desires to respond in writing to any facility's Application for Coverage or obtains relevant written public comment, coverage under this general permit of such a facility will commence on the later of the following:

- The thirty-first (31st) day following receipt by the Department of a completed and approved Application for Coverage;
- The thirty-first (31st) day following the end of a thirty (30) day public comment period; or
- The effective date of the general permit.

If the Department desires to respond in writing to any facility's Application for Coverage or obtains relevant written public comment, coverage under this general permit of such a facility will not commence until the Department is satisfied with the results obtained from written correspondence with the individual facility and/or the public commenter.

PESTICIDES

The Department has established, and will enforce, limits and conditions expressed in the general permit for the discharge of wastestreams containing various pesticides registered for use by the EPA and the Washington State Department of Agriculture. These agencies will enforce the use, storage and disposal requirements expressed on pesticide labels. The Permittee must comply with both the pesticide label requirements and the general permit conditions. The general permit does not supersede or preempt Federal or State label requirements or any other applicable laws and regulations. General permit Condition G24. reminds the Permittee of this fact.

HAULED DISCHARGES

If any discharges are hauled off-site, the Permittee shall be primarily responsible for assuring that those discharges are disposed of in strict compliance with all appropriate TDMs, limits, BMPs, and any other terms or conditions of the general permit. The Permittee shall be solely responsible for assuring that any hauler is made aware of all appropriate requirements of the general permit regarding any discharge which the hauler will be disposing. The Permittee's responsibilities concerning appropriate treatment/disposal of any discharge shall exist in all situations, even when the hauler/disposer is a contracted agent. A contracted agent shall be secondarily responsible for assuring that any discharges hauled to off-site locations are disposed of in strict compliance with any appropriate TDM, limit, BMP, or any other term or condition of the general permit.

Specifically when a contracted agent is used, the Permittee shall retain on-site a written contract, properly dated and signed by both parties (Permittee and contracted agent) prior to hauling any discharge. The written contract shall include, at a minimum, the following:

1. The name, address, and telephone number of the contracted agent;
2. The dates, or time period, for which the contract shall be valid;
3. The final discharge location of any hauled discharges;
4. The nature and volume of the discharges to be hauled;
5. A statement that both parties are fully aware and agree to fully comply with their responsibilities as given above; and
6. Dates and signatures of both parties.

GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

The general permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that the general permit be issued for five (5) years.

REFERENCES AND DATABASES USED

2002 Washington Agricultural Statistics, compiled by Washington Agricultural Statistics Service pp. 6-8.

Agricultural Chemical Usage – Postharvest Applications – Apples and Pears, March 2003, USDA, National Agricultural Statistics Service, Ag Ch1 (03).

EPA Reregistration Eligibility Decision (RED), CAPTAN, EPA-738-F99-015, September 1999.

EPA Reregistration Eligibility Decision (RED), DIPHENYLAMINE, EPA-738-R97-010, April 1998.

EPA Reregistration Eligibility Decision (RED), THIABENDAZOLE, EPA-738-R-02-xxx, October 2002.

A Guide for Fruit Packing Warehouses: How to Properly Manage and Reduce Your Pesticide Hazardous Wastes, (Ecology, revised March 1993, 90-42)

Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Washington State Department of Ecology Publication #93-36, May 1993.

Washington State Department of Ecology. 1994. Permit Writer's Manual. Publication Number 92-109

DATABASES

EXTOXNET (Extension Toxicology Network) Pesticide Information Profiles

Toxnet Literature Review, Toxicology Data Network.

Aquatic Toxicity Information Retrieval Database.

PAN (Pesticide Action Network) Pesticide Database

Environmental Fate Data Base

PICOL (Pesticide Information Center OnLine) Database

APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue this general permit for the fresh fruit packing industry. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

The Department will publish a Public Notice of Draft (PNOD) on April 7, 2004 in the State Register and the legal sections of the Yakima Herald-Republic and the Wenatchee World to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

General Permit Manager
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, Washington 98902

Any interested party may comment on the draft permit to the address above. Two (2) public hearings on the draft Fresh Fruit Packing General Permit will be held at least thirty (30) days after the date of the public notice. The first hearing will be held in the in the city of Yakima at the Department of Ecology Central Regional Office, 15 West Yakima Avenue, on May 10, 2004 at 3:00 p.m. The second hearing will be held in Wenatchee at the Washington State Apple Commission Building on May 11, 2004 at 3:00 p.m. A one hour workshop will precede each hearing.

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (509) 454-7298 or by writing to the address listed above.

The original permit and fact sheet were written by Greg Bohn in 1994. The 1999 re-issuance and this version were written by Steven Huber.

APPENDIX B -- RESPONSE TO COMMENTS

The Public Notice of Draft was published on April 7, 2004. Public hearings were held on May 10, 2004 in Yakima, Washington and May 11, 2004 in Wenatchee, Washington. The comment period ended May 12, 2004.

Two written comments were received. These comments are summarized below along with the Ecology response.

Comment 1

Received May 10, 2004 from Miles J. Kohl, Manager, Yakima Valley Growers-Shippers Association

The renewal process for the re-issuance of the Fresh Fruit Packing Industry NPDES Waste Discharge General Permit is a sound process including input from industry and the Department of Ecology. The Yakima Valley Growers-Shippers Association supports the re-issuance of the permit as outlined in the draft form. However, it should be noted that there continues to be concern within the industry that the current draft continues to lack any expedited process to allow for the use of new products under the current permit. Most notably, pear floats and fungicides continue to be identified as products that are under ongoing regulatory scrutiny, whose future use may be restricted. The lack of a process to ensure that new products can be used underneath the general permit umbrella causes a high degree of uncertainty to the fresh fruit packing industry. We appreciate the opportunity to provide input into this process to provide a flexible permit that serves the needs of the fresh fruit packing industry while protecting the natural resources of the State of Washington.

Ecology Response to Comment 1:

Adding the use of any new product to the general permit requires modification of the permit as defined in Chapter 173-226 WAC. This includes public involvement. Changing the modification process in the WAC requires legislative approval. However, the Department of Ecology (the Department) recognizes the need for information on the use of new products prior to their inclusion in the permit. To this end the department is working with the Washington Horticultural Association Postharvest Subcommittee Wastewater Workgroup to develop study protocols to gather this necessary information. In this ongoing process, facilities are able to use new products under the control of these protocols. No change was made to the draft permit.

Comment 2

Received May 12, 2004 from Tom Hon, City of Bingen Wastewater Treatment Plant Operator

Concerning proposed elimination of sodium sulfate in pear float water to POTW's, it has been my experience at the City of Bingen WWTP during the last 4 years that the treatment plant has been able to handle the amount of sodium sulfate received during packing season without unduly affecting operations. Extra scum, slime, and possibly Nocardia filamentous bacteria have been main effects noticed. The Underwood Fruit flow is approximately 10% of the total plant flow, and at the existing sodium sulfate levels received, plant is able to function. My concern is more with the levels of

fungicides, especially SOPP, whose levels fluctuate more and my guess is that those have more of an effect.

Ecology Response to Comment 2:

The Department will continue to work with permittees and POTWs to address the issue of the effect of fungicides on POTW operations. No change was made to the draft permit.

No testimony was given at either public hearings.

USEPA waived their right to review the draft permit.